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Quotable

"I am reasonably sure I will not buy any new CA products. I don't believe they're customer-focused."

JOHN WOOD
ROYAL BANK OF CANADA
On CA's pricing and licensing policies. See story page 1.

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EXECUTIVE BRIEFING

■ **Microsoft responds to concerns** that Windows isn't being used in mission-critical corporate applications by outlining a plan to let it connect better to the outside world. Users so far are noncommittal about the blue-print, while developers say they're already swimming in interface requirements. Microsoft also acknowledges gripes from a key Mail user about the product's problems supporting long messages. Page 1.

■ **Sophisticated POS systems**, handheld computers, self-service kiosks and other new technologies are turning up at checkout lines, ticket counters, gas pumps and elsewhere with increasing regularity. Technologies from electronic shopping cart screens to customer tracking cameras help companies plan product placement, follow purchase trends and improve customer service. Page 61.

■ **Some CA customers** are going public with complaints about licensing and pricing policies, criticizing the vendor as inflexible and costly. But a CA official vigorously disputes the charges, saying CA has held down price increases and offered many payment options. Complaints are a natural result of disruptions caused by CA's many acquisitions, he says. Page 1.

■ **Two computer virus authors** are arrested for launching an annoying virus over the Internet. The alleged authors were tracked down by an unofficial team of Mac virus busters. Page 4.

■ **IBM's effort to change** the rules with fast but pricey PS/2s based on a proprietary chip isn't generating much enthusiasm among users. Page 6.

■ **The state of California** signed an outsourcing contract with ISSC to ease the caseload for the state's Department of Social Services. Page 16.

■ **IBM's imaging system** rolls out in banking as Michigan National begins sending customers images of their checks. Similar services are soon expected to start up in Rhode Island and Massachusetts. Page 24.

■ **With Alpha announced**, DEC turns to the task of integrating its VAX/VMS base to the new 64-bit chip. DEC is providing 32-bit virtual addressing to smooth the road. Page 14.

■ **The password to get** into the retail sector is

X/Open. A trio of major retailers chains — Burlington Coat Factory, Wal-Mart and J. C. Penney — now say vendors need to comply with the application portability standards of X/Open. Page 44.

■ **IS managers** have to set records management policies with an eye toward the day when federal investigators might show up demanding the records that were trashed yesterday. Page 71.

■ **Networks based on SMDS** may be taking shape later this year. Bellcore has released its second set of specs for such networks. Page 45.

■ **On site this week:** Cost: \$3 million. Savings: \$5 million. Nabisco defies recession by arming its salesclerks with handheld terminals to collect data that helps stores sell and stock products more effectively. Page 12.

■ **The IRS** is finding that old Cobol systems can be modernized much faster than systems can be built from scratch. Page 51.

■ **Moving application development** from a mainframe platform to PCs translates into a 15% gain in productivity at Blue Cross/Blue Shield of Virginia. Page 37.

■ **Laptop computers** may be nice, but Continental Insurance wants more. The company feels it can get more out of portable PCs once the pieces come together in the pen-based computing sector. Page 42.

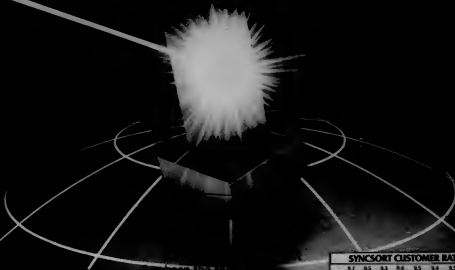
■ **IBM's SNA** may not be in for a long-term run at Bank of Vermont, but the institution is finding ways to keep the network up and running until SNA's time runs out. Page 45.

The 5th Wave

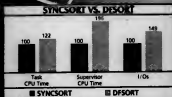


Real Programmers don't use micros. If it weren't for mainframe delays, there wouldn't be time to go to the bathroom or talk to all the other Real Programmers

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Apple to woo developers with 7.0 details

BY JAMES DALY
CWI Staff

NAPA, Calif. — Apple Computer, Inc. will assemble the cream of its systems software team this week for a two-day analysts' briefing that will spell out important new elements in System 7.0 that are slated to take shape during the next 18 months. Apple officials confirmed last week.

The company's latest strategy for its operating system's evolution involves snap-on extensions whereby users and developers can choose to either add or ignore advanced functions. Topping this week's agenda will be information on upcoming extensions such as the Open Collaboration Environment, which will feature a set of application programming interfaces that developers can use to link

disparate applications.

Apple already offers multimedia capabilities with Quicktime, an extension designed to make the integration of sound, video and animation into Macintosh applications more affordable and accessible.

The offering of tantalizing new details on System 7.0's evolution will serve as important advance work for May's developer conference, where Apple must present solid arguments that can stop the hemorrhage of developers moving research dollars to the potentially more lucrative Windows 3.0 platform.

Microsoft Corp.'s Windows

3.0 interface offers more than 60 million DOS users many of the graphical ease-of-use characteristics once available exclusively on Apple's Macintosh. Since its May 1990 debut, Windows 3.0 has sold nearly 10 million copies, according to Microsoft.



Heinen: "We care about developers' profitability."

"Apple is absolutely worried [about] holding onto developers. That's the whip driving this briefing," said Pieter Hartoek, editor of "The Hartoek Letter" in Alameda, Calif.

Apple officials confirmed that they are doing everything they can to make the Macintosh platform financially attractive to developers. "We're

absolutely on the side of the software developer — we care about your profitability," Apple Vice President Roger Heinen told a meeting of the Washington Software Association last week.

So far, Apple's greatest enticement for persuading software developers to stick with the Macintosh has been the well-regarded System 7.0, which boasts multitasking, file-sharing, virtual memory, 32-bit addressing and a revamped scalable font technology called TrueType. Users scooped up the system rapidly; the Cupertino, Calif.-based firm claims to have shipped 2 million copies since the rollout.

This strategy is causing consternation among some users, who fear added support costs and administrative confusion. "There will be no consistency because everyone will have a

slightly fragmented version of System 7.0," said Mike Bailey, a systems integrator at Lockheed Corp.'s Missile and Space Division in Sunnyvale, Calif. "Spreading out a couple of hundred places over a few buildings, and you aren't going to have a clue what they all have."

Another of Apple's key strategies for hanging on to developers in the past year has been to increase the installed base by drastically slashing the price of the Macintosh. The result is that while sales in the personal computer industry overall have been generally flat, Macintosh sales have soared. "We want developers to have plenty of people to sell to," Heinen said.

Heinen also denied reports that the life cycle of the Macintosh may be near its end. He noted in an aside that Apple wants to get into the personal electronics business, adding, "We're absolutely not killing the Macintosh."

Mac virus busters help nab two suspects

BY MICHAEL ALEXANDER
CWI Staff

ITHACA, N.Y. — An unofficial team of Apple Computer, Inc. Macintosh virus busters scored a victory last week by leading authorities to two virus authors and providing information that led to their arrests.

This is one of the rare instances in which a virus author has been arrested for creating and disseminating a virus, said Eugene Spafford, a member of the Macintosh virus team. Spafford is also an assistant professor of computer science at Purdue University in West Lafayette, Ind.

David S. Blumenthal and Mark A. Pilgram, both 19 and sophomores at Cornell University, were arrested on Feb. 24 and charged with computer tampering in the second degree, a misdemeanor. Other charges will probably be filed after the investigation is completed, a Cornell public safety officer said. The Federal Bureau of Investigation is also probing the incident.

The students, who were arrested and released on bail, face a maximum penalty of one year in jail, the public safety officer said. The pair is accused of creating a Macintosh virus called MBDF-A, deliberately infecting two computer games with the virus and using a third game as a Trojan horse to transport the virus. The students created all three games as well.

The virus infects the Macin-

tosh's operating system software file and other applications by attaching itself to other programs. It was not designed to destroy data but could cause some infected programs to malfunction and perhaps cause system crashes, said Jeffrey Shulman, a team member and author of a shareware program called Virus Detective, published by Shulman Software Co. in Morgantown, W.Va.

Infectious intentions

Viruses are introduced into company computers in a variety of ways

	Percentage of virus (base 602) Multiple responses allowed
Disk from home	43%
Electronic bulletin board	7%
Disk from sales demo	6%
Disk from repair or service person	6%
Disk from shrink-wrapped application	3%
Other downloaded	2%
Intercompany disk	2%
Purposely planted on disk	1%
Came with PC	1%
Disk from other source	4%
Don't know/Didn't respond	29%

Source: National Computer Association

CWI Staff: Michael Nguyen

The three games — Onococcus Tetris, Tetriscycle and Ten Tile Puzzle — were launched from a computer at Cornell via the Internet and deposited in several computerized archival systems around the world, including one called Sumex-Aim at Stanford University.

"I'd say more than 200 people downloaded the game in a couple of days," said William Lipsa, a team member who administers the Macintosh file section of the Sumex-Aim system

at Stanford University.

A mathematics professor in Wales downloaded the games, discovered they were infected, and sent copies of the virus for analysis to John Norstad, a team member. Norstad is the author of Disinfectant, an antivirus freeware package, and a network analyst at the academic computing center at Northwestern University in Evanston, Ill.

Norstad alerted Lipsa, who determined that the games had been transmitted from Cornell. "It was very easy to see where they had purportedly been E-mailed from, which was an account at Cornell," Lipsa said.

Other team members notified Cornell officials, who immediately began their own investigation. The logs of computer systems in a computer laboratory confirmed that the virus had been released at Cornell, a university spokeswoman said. "Both [students] were employed at the computer information lab, and it is believed that

one of the computers in the lab, of which one of the guys was an operator, was used to launch this," the spokeswoman said. Following the discovery, the students were arrested, their rooms searched, and computer equipment and disks confiscated.

Cornell received national attention in November 1988 when Robert T. Morris, then a computer science graduate student, injected a worm program into the Internet and caused thousands of computers to crash.

Conrades departure reflects overhaul of IBM exec ranks

BY NELL MARGOLIS
CWI Staff

ARMONK, N.Y. — Erosion of IBM's executive suite accelerated last week when 30-year veteran and Senior Vice President George Conrades, who until recently was viewed as most likely to succeed Chairman John Akers, left the firm.

Conrades said he is taking early retirement to make over a panoply of career opportunities. His announcement came less than a week after IBM World Trade head C. Michael Armstrong, widely seen as having founded Conrades' former "best performer" mantle, jumped ship to take on stewardship of Hughes Aircraft Co. (CJW, Feb. 24).

Conrades' departure poked less of a punch than did Armstrong's midmonth stunner, largely because it had been anticipated since his November demotion from head of U.S. operations to a lesser marketing post. Jim Marston, chief information officer at American President Cos. in Oakland, Calif., said the sudden thinning of IBM's top ranks gives all information systems managers reason to reflect.

"These are obviously the strongest executives in IBM, and they at least believe their fortunes lie elsewhere," he said.

The executive exodus is a

healthy sign of an IBM "truly going down the path it said it would be going down," said Peter Burr, an analyst at Framingham, Mass.-based market research firm International Data Corp.

IBM's old guard not only was formed by decades of traditional, hierarchical corporate culture, but it also "came of age during an era when IBM was terrified of the (U.S.) Department of Justice," Burris said. The government's antitrust suit against IBM, filed in the late 1960s, shadowed more than a decade of IBM operations before it was dropped in the final days of 1981. "They learned to shrink from the importance of competition," given the constant threat of antitrust actions, Burris said.

The old guard also came into power during the era of mainframe-oriented, glass-house IS control — a factor that has caused a host of users and analysts to question during recent weeks whether the virtual cultural revolution IBM outlined in December can succeed under any leaders whose roots are deep blue.

Burris said, "We are very quickly going to see a new managerial animal emerge at IBM — capable of forcing change and managing it — hopefully well and keeping the company's basic [service-oriented] tenets."



Conrades will oul over career opportunities after leaving IBM

DEVELOP IT ONCE AND FOR ALL.

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NEWS SHORTS

Social Security data illegally sold?

U.S. Sen. David Patrick Mayhew (D-N.H.), at a privacy hearing held late last week, said he is "deeply disturbed" by reports of the illegal theft and sale of personal records maintained in Social Security Administration databases. Federal prosecutors recently indicted eight so-called "information brokers" for allegedly bribing Social Security Administration employees to obtain the information, which includes a person's complete salary history. Mayhew said buyers apparently include private investigators, prospective employers, lawyers and insurance companies.

Motorola settles overcharge case

Motorola, Inc. last week paid the General Services Administration \$15.1 million to settle a charge that it knowingly sold the government used computer equipment as new and failed to disclose, as required by law, that it offered commercial discounts on equipment and maintenance greater than those offered to the government. The deceptions occurred between fiscal years 1962 and 1988. In a statement, Motorola denied any violation of law but expressed regret that its systems of internal controls at the time were "not as responsive as they should have been."

Software users win tax victory

Software vendors and users succeeded in exempting most software from a mandatory 14-year write-off that was contained in the Democratic tax package which the U.S. House of Representatives passed last week. The tax bill requires a long amortization period only for custom software acquired for an entire business and would require other software to be written off over 36 months.

Hyundai offers lifetime warranty

In what is possibly an industry first, Hyundai Electronics America has unveiled a lifetime warranty program for buyers of a qualified Hyundai personal computer purchased between March 1 and June 30. Under the "Get a Lifetime of Value" promotion, Hyundai will also offer software, software support and accessories at special discounts. The lifetime warranty covers the base system, including the motherboard and components.

Losses force DG on-site searches

Data General Corp. began searching employee pocketbooks and briefcases at manufacturing plants in Massachusetts and South Carolina last week. A DG audit recently revealed that the firm has sustained about \$1 million in component losses at both plants during the last 12 months, a spokesman said. Employees got advance warning of the searches, which have been conducted "from time to time" over a 10-year period.

Short Takes

Microsoft Corp. said price cuts on the MS-DOS 5.0 upgrade will mean retail prices of under \$50 after March 20. The company claimed that 2.7 million copies of the upgrade have been sold since its July 1991 introduction. . . . Today in Tokyo, Compaq Computer Corp. will announce its first desktop and server products for the Japanese market. . . . Gilbert P. Hyatt, who holds the single-chip microcomputer patent, last week signed licensing agreements with six Japanese electronics vendors in the wake of a similar agreement with North American Philips Corp. . . . A consortium of 19 companies has launched an interoperability laboratory for the PEX standard — an extension of the X Window System for the transmission of three-dimensional graphics between disparate networked systems. It is based at Convex Computer Corp. . . . United Telecommunications, Inc. has officially changed its name to Sprint. . . . Unisys Corp. last week joined the Open Software Foundation. . . . A report in a Japanese publication says Oki Electric Industry Co. is negotiating with IBM Japan Ltd. and Hewlett-Packard Co. to sell IBM's Application System/400 computer and HP's HP9000 through its distribution channel.

More news shorts on page 14

Users give Sun an earful

Need better software quality, support as vendor hits second decade

BY MARYFERAN JOHNSON
OF STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. marked its 10th birthday last week, celebrating a string of accomplishments that help transform the technical workstation pioneer into a \$3.2 billion commercial powerhouse with more than 550,000 systems sold.

Under Chief Executive Officer Scott McNeely's leadership since 1984, Sun helped legitimize the Unix operating system and kicked off the inexorable march toward open systems. Yet it also woke the sleeping giants of IBM, Hewlett-Packard Co. and Digital Equipment Corp. — all of whom are now gunning for Sun's market share.

How can Sun keep its edge in the next 10 years? To answer that question, *Computerworld* asked several Sun customers to pass along some advice.

"Keep promoting standards," said Michael Prince, MIS director at Burlington Cost Factory, Inc. in Lebanon, N.H., which has a network of 170 Suns in its stores nationwide. "That's one thing that made Sun novel: They took things that other companies would have made proprietary and made them de facto standards."

Improving the quality of Sun software topped the list for Federal Express Corp. in Memphis, which uses Sun Sparcstations to manage part of its package delivery business. "They need more emphasis on software quality because some of the bugs we've found in Open Windows [Sun's graphical user interface] hold us up, and that's frustrating," said Tim Gaudier, a senior programmer/analyst at FedEx.

Several users lauded Sun's joint development projects with

other hardware and software vendors. Yet some are worried that software unbundling — such as removing the C compiler from the next version of the Solaris operating system — will claim other favorite utilities. "If they don't figure out a way to provide really good support for products in an unbundled world, Sun will lose its advan-

age at the big commercial markets, they'll forget those smaller but very important ones."

"I'd ask Sun to start listening again," said David Pensak, corporate adviser for computer technology at Du Pont Co. in Wilmington, Del. "Sun needs to have an advisory board of users who can meet with their technical committees and really talk."

Lengthening shadow

Anticipation in Sun's historic rise

1982... Promoted first workstation ships.

1983... Sun-2 introduced.

1984... Network File System.

1985... Sun-3 introduced.

1986... Sun-4 introduced.

1987... Sun-5 introduced.

1988... Sun-6 introduced.

1989... Sun-7 introduced.

1990... Sun-8 introduced.

1991... Sun-9 introduced.

1992... Sun-10 introduced.

1993... Sun-11 introduced.

1994... Sun-12 introduced.

1995... Sun-13 introduced.

1996... Sun-14 introduced.

1997... Sun-15 introduced.

1998... Sun-16 introduced.

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2004... Sun-22 introduced.

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2018... Sun-36 introduced.

2019... Sun-37 introduced.

2020... Sun-38 introduced.

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2022... Sun-40 introduced.

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2042... Sun-60 introduced.

2043... Sun-61 introduced.

2044... Sun-62 introduced.

2045... Sun-63 introduced.



CW Chart Market Figures

tage," said Barbara Kostinick, MIS director at Consumer Health Services in Boulder, Colo. "Even happy Sun customers like me will have to look at the competition if they start unbundling a lot of the software products I use now."

At a loss

Some users in the educational and technical markets said they felt "abandoned" by Sun as the firm grew and its willingness to cut discount deals shrunk. "Sun got where it is today by supporting excellent hardware and software in the research and development communities," said Peter Salas, executive director of the Sun User Group's national office in Brookline, Mass. "My fear is that in looking

Pensak and other users is lost the peace of days when Sun was more flexible in dealing with start-up firms. "They used to be a lot more cooperative if a small start-up didn't have a lot of cash front," Pensak said.

At Purdue University in West Lafayette, Ind., which has at least 650 Suns throughout its engineering departments, a product warranty longer than Sun's standard 90 days would be welcome, said Curt Freedman, manager of systems engineering. "Sun has gotten very complacent about things," he said.

Sun's reputation for arrogance — what one user called "a certain attitude" — is something commercial customers find unappealing. "Sun needs to dispel that image, and that's particularly true with corporate users," Prince said. "On the other hand, they're very results-oriented, and there's a real striving for excellence at Sun that is very impressive."

John Levinson, an analyst at Goldman Sachs, Inc. in New York, said Sun's biggest challenge will be to maintain a high level of creativity. "They've been incredible at being a year or two ahead of what other companies end up having to do," he said, citing Sun's mid-1991 reorganization into several independent business units and its licensing of the Scalable Processor Architecture chip technology.

"Sun has got to keep doing things where you say 'Why the hell are they doing this?' and then you realize about nine months later it was incredibly forward-looking," Levinson said.

McNeely mots

Brash? Certainly. Arrogant? Sometimes. But boring? Hardly. Here are some quotable samples of Sun CEO Scott McNeely over the years:

• "When two wheels are off the cliff, we start getting careful. With one wheel off, we just step on the gas."

Fortune, Aug. 17, 1987, on Sun's rapid growth.

• "DEC and IBM are two of the toughest competitors in the world. You can't kick them in the pants without getting the wrong kind of attention." *Sun Jan Mercury News*, Jan. 26, 1987.

• "I had no idea what I was getting into. You've heard the expression 'Ignorance is bliss.' Sometimes I think it's my motto." *USA Today*, Jan. 19, 1988, on starting Sun.

• "We're not interested in replacing typewriters." *Fortune*, Feb. 12, 1990, on the difference between Sun and the PC manufacturers.

• "I wouldn't say we're arrogant, but we have what I would call belligerent consistency." *Associated Press*, November 1991.

"THE TASK IS TO INTEGRATE THE OLD AND THE NEW."



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CLIENT/SERVER ARCHITECTURE FOR THE ON-LINE ENTERPRISE

IBM, CA review prices

CONTINUED FROM PAGE 1

tiered pricing "to meet new requirements. Some of these involve partitioning." The basic concept behind partition-based pricing is being tested with at least eight large IBM customers, according to Bruce Allen, vice president at Meta Group, Inc., a market research firm in Westport, Conn.

CA is investigating a host of new pricing plans, including partition-based pricing, user-based pricing and a lending library approach that would charge users based on the amount of time a package was downloaded from the CA "library."

"I think we're seeing a growing resentment toward graduated tier pricing, and I don't think there's a rational justification for it," CA Executive Vice President Arnold Mazur said. He said CA has not yet come to any conclusions about a different pricing model but added, "We're going to address it. I don't want to have to deal with this issue next year at this time."

Customers reacted positively to the news. "To me, that is a much more sensible [and equitable] approach," said David Moore, vice president at Mellon Bank

Corp. in Pittsburgh.

Still, analysts said, users should not expect a perfectly tuned model when it is first introduced. "It will be a very rudimentary approach," Allen said. "It will be refined over time."

In its beta testing, IBM is looking at how much of the hardware's power the software package consumes. If the software uses less than half of the processor, IBM will offer discounts up to 30% over the existing tiered price. Further discounts will be offered for customers with multiple machines running the same software.

There are still many issues to be resolved, Allen said — most notably that IBM and its customers will need an automated means of tracking what software is

running and how much of the processor it is consuming. The IBM spokesman said IBM plans to offer such a tool but would not say when it would be available.

I THINK WE'RE seeing a growing resentment toward graduated tier pricing, and I don't think there's a rational justification for it."

ARNOLD MAZUR
CA

Still, IBM customer engineers and other representatives that work at customer sites may be called on to audit.

Another issue concerns the basis on which use will be measured. Typically, use peaks at certain times during the day as well as during key periods such as month- or year-end processing.

dBase upgrade fills few gaps

BY CHRISTOPHER LINDQUIST
OF STAFF

SCOTT'S VALLEY, Calif. — Borland International, Inc. last week unwrapped dBase IV Version 1.5 for DOS, an upgrade that adds several features including mouse support, increased numbers of work areas and a filter that allows selection of records based on a previously created index.

Other enhancements to dBase IV include automatic configuration detection and installation, file linking on calculated fields, improved blank support, low-level I/O functions and conditional compilation.

Borland said the upgrade demonstrates its continued support for dBase, but some users said they are still waiting for a compiler, which today is available from third parties such as Nantucket Software Corp.

According to database consultant Richard Pincus, president of Performance Computing, Inc. in Chicago, Version 1.5 is "incremental" and constitutes a "solidification of the current product" that offers improved ease of use and functionality. He added that dBase IV is already a mature product and that most of the major database advances for Borland would come in the Windows versions of dBase and Paradox.

Rock Blanco, vice president of information systems at Garber Travel, Inc. in Boston, said his company has "some key things that are still dBase-oriented" and that he would appreciate any improvements Borland has made. However, since his firm started working with Fox Software, Inc.'s Foxpro and Borland's Paradox, Blanco said, "We haven't been fooling with dBase too much."

Version 1.5 is scheduled for availability this month for a suggested retail price of \$795. Upgrades from earlier versions will cost \$99.95.

Network packs in 1-user (\$395) or 10-user (\$3,495) increments and runtime versions (\$250) will also be available.

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High-tech keeps Nabisco No. 1

BY ELISABETH HORWITT
OF STAFF

EAST HANOVER, N.J. — To keep a leading share in a recessionary market with discount brands slipping at its heels, Nabisco Biscuit Co. did not just get MAD; it got VAST.

The \$2.7 billion company has spent the past five years and \$3 million building a Merchandising Activities Database (MAD), together with Value Added Selling Techniques (VAST), a series of sales applications. Linked to Norand, Inc. handheld terminals, the IBM mainframe-based applica-

tions are effectively changing the selling regimen of Nabisco's sales force.

The technology, rolled out during the past year, has also increased sales force productivity by more than \$50 million per year, a Nabisco spokesman said.

"Our business is driven by a 3,000-person sales force that spends 5 million-plus hours a year in the stores," said James R. Chambers, vice president of information services at the firm. "So we are using technology to turbocharge that force."

Like Nabisco, a growing number of food and beverage compa-

nies are arming their sales forces with handheld computers to enter and access store-by-store information about products' shelf movement, prices and weekly promotions. The data can then be used to help store buyers make more effective use of shelf space and marketing dollars — and hopefully give more play to the manufacturer's brands.

Nabisco's competitive edge may well be VAST. Prior to its advent, Nabisco sales representatives had to pore over a series of hard-copy reports, and most wrote out their presentations by hand, said Don Castle Jr., director of sales technology and administration, who headed the systems' development. Few sales representatives would take the time — often days — to make full presentations, he added.

Now, sales reps plug their handheld computers into the remote mainframe connection, and "VAST walks you through. You look up the numbers, push a few buttons and out pops a graph," Castle said. "Total time: 45 minutes."

With the initial rollout virtually complete, Chambers' group is already working on expanding VAST's repertoire, as well as its ability to advise sales reps on how and when to use a growing number of applications.

Nabisco will have to tread a fine line, however, between giving sales reps too much direction



Nabisco's Castle (left) and Chambers are using technology to turbocharge their sales force of 3,000 staff members

and too little. Chambers said, "If you go to a prescription [of how to sell], you take away the value sales can add. So you recommend and leave them at the point where the computer can't add any value, but the person can."

In order to support VAST's future growth, Nabisco plans to put more local computer power in sales reps' hands during the next two years, Chambers said. The company will replace field representatives' 6-year-old handheld terminals with higher capacity systems that may be laptop, handheld or pen-based, Chambers said. Representatives

in the office will go from 3270-to-host connections to personal computer local-area networks.

By concentrating on business applications first and technology upgrades second, Nabisco has avoided the trap of installing state-of-the-art technology for its own sake, said Stephen Ruch, a principal and senior economist at Morgan Stanley & Co. The company seems to be on "the right road of emphasizing creative, active applications that can redefine the business environment, as opposed to tools that will make more work in that environment," he added.

New sales recipe

How do you give your sales reps the right weapons and battle techniques to lick your rivals in the trenches? Suppose a rival offers a store \$100 to put in a big display and promotion for its cookies. A sales rep for Nabisco can look up the relevant VAST application, "Conducting up-front money," and follow these steps:

• First, establish the goal: Prove to the store buyer that a display of Nabisco's competing brands will bring in greater profits, even without the up-front money.

• Second, use VAST to lay out the data needed to prove this, such as comparative gross margins and turnover, with and without a display.

• Third, consult VAST for data source suggestions such as MAD, syndicated databases and supermarket scanners.

Once the data is input, the sales rep generates a chart that shows how much more profit a Nabisco display will bring in than a rival brand display, even with the \$100 incentive.

CA policies anger some shops

CONTINUED FROM PAGE 1

"I am reasonably sure I will not buy any new CA products. I don't believe they're customer-focused; they're much more interested in acquiring companies and in generating maintenance revenues," said John Wood, vice president of computer and network services at the Royal Bank of Canada in Toronto.

He cited several reasons for shying away from new CA purchases, including technical problems with CA-Dispatch, which he said the Royal Bank eventually returned after 18 months of trying to get it to work.

Another customer, Argo-Tech Corp. in Cleveland, is in the process of replacing all its CA software, said Tim Miller, manager of computer operations. Argo-Tech last month converted from CA's Dynam/TLMS to Goal Systems International, Inc.'s Epic/MVS tape-management system.

Disgruntled users
Additionally, an informal survey by Westport, Conn.-based Meta Group, Inc. of more than 100 Fortune 500 users indicated a

"high level of dissatisfaction" among an "overwhelming majority," said Richard Howe, a Meta Group vice president.

He added that a "substantial" number of these users are searching for alternatives to CA.

A CA spokesman responded, "For every unhappy customer, there are thousands more who are satisfied." He added that preliminary results of a CA survey of 1,000 customers showed that 84% said their overall relationship with the company is "good or excellent."

Tom Lowne, vice president of data processing at Alamo Rent-A-Car, Inc., a large CA shop in Ft. Lauderdale, Fla., said, "I'm getting rid of every CA product I can. I'm paying more for maintenance on Librarian than what I paid for the product seven years ago. And they haven't enhanced it."

Lowne said he wrote a letter notifying CA of his decision some four weeks ago.

Mauz said CA is not charging unreasonable maintenance fees. For example, CA did not raise prices for either products or

maintenance from August 1987 until March 1990, after which the company levied a 5% hike across the board, he said.

Typically, CA comes out with "new releases containing major enhancements" every 12 to 15 months, Mauz said.

Mauz allowed that Librarian is a special case because of conditions that existed before CA acquired Applied Data Research, Inc., the product's developer, in 1989. These conditions are two price increases and a change in the maintenance rate from 15% to 18%. But he said CA "fixed" the problems by not putting Librarian onto tiered pricing for a year, among other measures.

And, Mauz said, CA is addressing some of the software-pricing issues that plague the industry as a whole, including searching for an alternative or substitute to tiered pricing (see story page 1).

He also said CA is extremely flexible about pricing, allowing 8 to 10 payment options in a typical year and providing price discounts as well.

Mauz said some customers may be unhappy with CA pricing policies because, in essence, CA is a bigger player than most other independent software compa-

nies. The other vendors "have a small enough slice of any particular customer" that bills from those suppliers are low enough not to be singled out for special attention. But at a large CA shop, Mauz said, "It doesn't take very long before someone who is moving from a Group 40 processor to a Group 70 or 80 is starting at a \$120,000 upgrade fee."

Hidden complaint

Another issue leading to customer dissatisfaction, Mauz agreed, is the perception that CA is arrogant. "I tend to think that that is also said about other companies who happen to be very good at what they do. We think we do things properly, effectively. If that's being arrogant, then we're arrogant."

To help defray these concerns, CA executives regularly meet with information systems directors at briefings that the vendor hosts regularly. CA has held 12 chief information officer briefings within the past year, a spokesman said, with an average of 50 IS executives attending each session.

Pete Clark, a systems programmer at Otan Mills, Inc. in Chattanooga, Tenn., said he is

unhappy for a different reason entirely. Otan Mills has been sparring with CA over a license agreement for Interest, a package that CA acquired with its purchase of On-Line Software International, Inc. He said CA "wants us to sign a new license" to replace the one Otan had with On-Line.

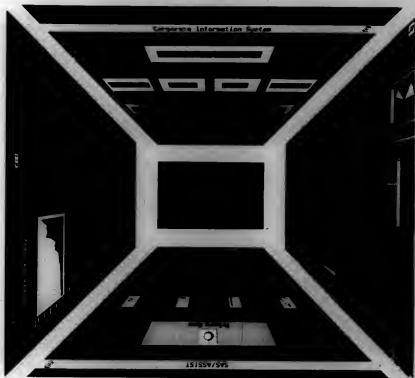
Clark said he has referred the matter to his legal department, and, in the interim, "as long as I can find a reasonably competitive product, I will."

A CA spokesman said it is company policy to "honor all existing contracts from On-Line, Panoptic, whatever."

Then, too, CA has certainly weathered other bumpy rides with user opinion, most notably after its acquisitions of Uccol, Collier Software, Inc. and Applied Data Research.

Users wondered then if CA would continue to support and develop their products from the old vendors, and many users said CA has.

On one point, both Mauz and users seem to agree. "Vendors and customers have a whole lot of other things they should be doing rather than fighting with each other," Clark said. "Nobody's going to win out of this."



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NEWS SHORTS

Taligent names officers

Apple Computer, Inc. and IBM confirmed last week that Joseph Guglielmo, 50, IBM's vice president and general manager of marketing and business development for Personal Systems, will become Taligent's chief executive officer and chairman. Ed Burns, 39, Apple's senior vice president and general manager of the Object-based Systems Division, was named chief operating officer of the jointly owned object-oriented software venture. It officially opens its doors today at Apple's Cupertino, Calif., headquarters. Both firms dodged questions about what kind of products will be delivered and when they will appear.

CASE pioneer invests in firm

Two weeks after disclosing that he had bought a stake in an artificial intelligence firm, computer-aided software engineering pioneer James Martin said he made "a major investment" in Versant Object Technology Corp., an object-oriented technology company in Menlo Park, Calif. Terms were undisclosed, but Versant said the money would be used to expand current object-oriented database management system lines.

Lotus and Borland fire off pilot

Lotus Development Corp. and Borland International, Inc. last week provided groupware updates at Eastern Dyno's annual PC Forum. Lotus and Action Technology, Inc. have launched a pilot project to incorporate Action's work-flow technology into Lotus Notes. A Lotus spokesman said the project is to have a product out in 1992. Borland said it will publish specifications for software called Object Exchange, which will manage the sharing of various kinds of data between Borland and third-party applications. The goal is to have other companies tie into it. No delivery date has been announced.

Max Headroom eyes boardroom

Videoconferencing competitors Compression Labs, Inc., Pictured Corp. and Videotext Corp. last week announced that their respective systems have successfully interoperated using the international videoconferencing standard known as PK64. This means that customers should be able to mix and match equipment from the different vendors.

Fiber optics links HP and IBM

Hewlett-Packard Co. and IBM said they have formed a strategic alliance to develop, manufacture and market high-speed fiber-optic technology. The alliance's first product, called the Optical Link Card, was developed by IBM for use with Application Systems/400s and RISC Systems/6000s. It will be redesigned to conform to ANSI specifications and will be manufactured by HP in California next year. The OEM card will cost from \$300 to \$400.

Short takes

AT&T Ltd. and AT&T's UK-based systems integration unit, has agreed to acquire Dataid, a French software and information services company with revenue of about \$124 million. . . **AT&T Network Systems** recently announced plans to deliver National ISDN-2 — an enhanced nationwide standard-integrated Services Digital Network to be deployed mid-1993 — on its SS7S central office switch. . . **Borland International, Inc.** has shipped Turbo C++ Version 3.0, a compiler targeting native C language and C++ programs. It lists for \$99.95. . . **Dun & Bradstreet Software** recently dissolved its Advanced Manufacturing International software business unit, eliminating 65 jobs. . . **Samsung Electronics Corp.** is the 17th firm to license single in-line memory module technology from Wang Laboratories, Inc. . . **Compaq Computer Corp.** sliced prices 19% to 31% on its entry-level, Intel Corp. 20-MHz 80386SX-based desktop systems. . . **Toshiba America Information Systems, Inc.**, battling weak demand, dropped prices on its Intel 386SX- and 386SX-based notebook computers between 22% and 26%. . . **Disk Technologies Corp.** in Winter Park, Fla., announced a removable 2 1/2-in. hard drive with 120MB bytes of storage capacity.

DEC readies RISC Alpha chip

Company strives to make migration easy for 32-bit VAX/VMS users

BY SALLY CUSACK
OF WASH.

HUDSON, Mass. — With Digital Equipment Corp.'s debut of its reduced instruction set computing (RISC) Alpha chip last week, users can now start examining how and when to migrate software applications to these higher performance systems.

Industry analysts predicted that the first Alpha boxes will ship to independent software vendors this summer, and the first complete systems will be available to end users by year's end.

DEC had kept VAX/VMS users' migration plans in mind with its RISC chip strategy. While Alpha for OSF/1 will support 64 bits from the outset, Alpha for VMS will initially support 32 bits of address space (CW, Feb. 24). DEC took this tack to facilitate another migration of applications from 32-bit VAX/VMS systems to Alpha-based machines, according to Nancy Kronenberg, a senior engineering consultant at DEC.

Stanley M. Ruse, vice president of technology strategic planning at Bankers Trust Co. in

New York, said he approves of DEC's current strategy, noting that the 32-bit structure is essential for early compatibility on both the Alpha and existing VAX platforms. He said the bank has not encountered an addressing problem in the 32-bit framework.

The majority of VMS users have not come anywhere near the 32-bit limit, Kronenberg said. Many, however, are starting to hit constraints, such as speed, with hardware performance on current VAX/VMS models, she added.

VMS applications that contain user-customized macros or privileged instructions could complicate application migration, noted Wesley P. Mellis, program director of mid-range computing at Gartner Group, Inc. in Stamford, Conn. Other potential snags in the migration process could occur with timing-dependent items, such as real-time applications, or dependencies on third-party software providers.

DEC has officially changed the name of VMS to Open VMS and hopes to migrate the bulk of its VAX installed base over to

the Alpha architecture during the next decade. The company claims that most users will be able to recompile 90% of their applications over to Alpha within a matter of hours.

DEC OSF/1 developers meanwhile can have their applications run on DECsystems and DECstations, which are MIPS Computer Systems, Inc.-based and can recompile the same applications on machines that incorporate the Alpha chip, a DEC spokesman said.

In all, Mellis said, he is "pretty positive" about the software migration issues of Alpha.

DEC is establishing migration centers worldwide to assist VAX customers during the transition. Alpha boxes will be able to share files with VAXs immediately.

For the time being, however, some users are withholding judgment on the new architecture. "It is a wonderful advance in technology, but it won't effect anything we do until there are some bones on the table," said Glenn Orenstein, a longtime DEC customer and assistant chief engineer in the information technology division at Stone & Webster Engineering Corp.

Windows plan wos enterprise

CONTINUED FROM PAGE 1

10 million licenses, Windows is largely found in single-user applications or as a graphical front end on a network server, observers noted.

Until WOSA, which will comprise a collection of APIs, Windows applications would be written to use Windows as an "isolation layer" to access outside services written to the service provider.

Agreement on APIs is rarely easy, however. And the sheer number of APIs and architectures associated with Windows may have a chilling effect on developers.

"A lot of big users are starting to freeze [their moves to] Windows as a corporate standard," said Neal Hill, a senior software analyst at Forrester Research, Inc. in Cambridge, Mass. He indicated that the constant stream of new APIs and new directions for Windows emanating from Microsoft has made the environment a moving target for developers and users.

In addition, this frenetic activity slows the impression that Microsoft is "putting patches on the rickety architecture of Windows," he said.

Microsoft sees this differently. "Think of Windows as a socket, and any kind of service can be plugged in," Gates said in his presentation at Eastern Dyno's 1992 PC Forum last week.

But while the cry is certainly being sounded, independent software vendors are finding themselves facing an increasingly daunting array of APIs and architectures to choose from. "It is getting kind of crazy," said J. Paul Grayson, chief executive officer of software developer Micrographix, Inc., which has built a business on Windows programs.

However, if independents do begin supporting the various pieces of WOSA, it could be a boon to users in heterogeneous environments, according to some users contacted last week.

Several said they will be taking a wait-and-see attitude toward the architecture for now, though some

"As an off-the-shelf integrator, this is of keen interest to us," said Timothy James Lee, a senior consultant at Plan B Consulting in Winnetka, Calif. "We've been backing those kinds of solutions using [Dynamic Data Exchange] and Lee in kind of kludge available." Every

dicted that he will be cautiously waiting until some vendors produce products, however.

Previously announced initiatives that Microsoft said fall under the WOSA banner include the following:

- Open Database Connectivity (ODBC), which would allow users of Windows applications, such as spreadsheets, to access data on platforms not running Windows — Oracle Corp.'s database on a Digital Equipment Corp. VAX, for example.

- Morrow said Lotus is working with Microsoft to ensure that its Datasheet Driver technology will be compatible with ODBC, but he declined to say when any products would be available.

- A Microsoft Application Programming Interface (MAPI), through which mail-enabled Windows applications can communicate. Eventually, if MAPI is supported by third-party vendors, users could format a mail message and distribute it to a variety of non-Windows mail systems across a company.

- An unnamed licensing API that would let system managers track all copies of the software being run on dissimilar systems throughout an enterprise.

Microsoft said it has been meeting with third-party developers concerning the specifications for the above services for some time but could not give any details as to when final versions would be available.

Samsung, HP align on low-end station

BY MIKE MAGEE
SPECIAL TO CW

PALO ALTO, Calif. — A strategic alliance between Hewlett-Packard Co. and South Korean giant Samsung Electronics Corp. will bear fruit later this year in a low-end Unix workstation line.

powered by Samsung's new implementation of HP's Precision Architecture-RISC chips, company officials confirmed last week.

Samsung engineers have managed to combine several PA-RISC chips on a single integrated circuit, according to company

sources. The low-voltage reduced instruction set computing (RISC) processors were developed at Samsung's plant in Ki-hung, South Korea.

The workstations are expected to run the Open Software Foundation's OSF/1 Unix operating system rather than HP's

Unix variant HP/UX, but Samsung officials said the decision on OSF/1 was still under review.

Also undecided is whether Samsung will distribute the workstations in the U.S. as well as in the Far East. "We are still talking about that," said Youn Huh, executive director of workstation systems at Samsung's San Jose, Calif., facility.

The collaboration between

HP and Samsung "underlines the trend" in vendor relationships during the past year, like the one between Digital Equipment Corp. and Cray Research, Inc., according to Lars Mieritz, an analyst at Technology Investment Strategies Corp. in London.

Senior editor Maryfran Johnson contributed to this report.

Microsoft betters C tool

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Microsoft Corp. sought to both remedy user complaints about its previous C efforts and take a swipe at Borland International, Inc. with last week's release of C/C++ Version 7.0, its first object-oriented version of the C language.

The new release counters Borland's offering, Turbo C++, and is said to rectify the ease-of-use and productivity problems that plagued Microsoft's previous C release.

Version 7.0 for Windows 3.1 contains extensive class libraries of objects that support the Microsoft Windows environment. Users can reuse these stored objects as they write Windows applications.

Slated for shipment next month, Version 7.0 conforms to the AT&T C++ 2.1 specifications, Microsoft said at the Software Development '92 conference here.

Microsoft conceded that its 20-month-old C Version 6.0 had some problems. Some large C language projects at user sites lost significant time in the coding phase — a problem that caused some corporate users to switch to other C++ packages.

Some longtime Microsoft C users approved of the move to object-oriented programming. "Microsoft has encapsulated Windows APIs into objects, which makes it very easy for me as a Windows developer to make the transition to C++," said Odis Wooten, president of NanoSoft Corp. in Houston.

The package gives users the option of compiling their programs into "packed code," which occupies about 60% of the memory space of native C language code. Microsoft used packed code, or P-Code, to build many of its own applications, including Excel. Also included are preprogrammed routines that users can copy to save time.

"The critical points for [7.0] success will be the integration with Windows and the type and quality of code it produces," said Michael Schneider, an analyst at Gartner Group, Inc.

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IBM claims high road for OS/2

BY ROSEMARY HAMILTON
ON STAFF

TUCSON, Ariz. — While IBM attempts to position OS/2 Version 2.0 as an operating system without peer and says it will not go head-to-head with Microsoft Corp.'s Windows, it is also working on a product launch that shows it has Microsoft very much on its mind.

"Right now, there's more tension [in the market] than I'd like to see," said Bernard Serrat,

an assistant general manager of Personal Systems at IBM, in an interview at PC Forum here last week. "I do have to be careful of how I play my hand."

Serrat said the company has three different March dates targeted for the formal announcement of 2.0's general availability ship date, which is set for March 31. "We have three in place, and I want to keep some flexibility," he said. "I have to think through what others are doing."

He hinted that his unwilling-

ness to pin down a date is designed to avoid a response from Microsoft, which is planning to launch Windows 3.1 in early April.

IBM claims it is taking the high road and that both companies can benefit from their off-again because Windows can run under OS/2. "I don't have to drag down Microsoft," Serrat said.

Serrat added that his goal is to sell OS/2 based on its capabilities, not on a feature-by-feature comparison to Windows. In fact, Serrat said, the "better DOS than DOS, better Windows than Windows" slogan, which IBM used heavily last year, will not be used anymore.

"It kind of caught on," Serrat said of the slogan. "Some people at IBM liked it and repeated it." A spokesman said IBM used the slogan to help define OS/2 and feels it is necessary now.

At the same time, IBM is apparently organizing its OS/2 strategy so that it does not get upstaged by Microsoft.

"At Comdex, we ought to showcase OS/2, and we will do that, not a launch like Microsoft is planning," Serrat said.

The company has been reluctant to give details on how it will market the product. For instance, it continues to maintain that it has not finalized OS/2 pricing. Recent reports suggested that IBM is considering bargain basement prices and that Microsoft intends to respond with lowball prices for Windows 3.1. Neither company would confirm these reports.

Big Blue picked to develop system to monitor child abuse

BY NELL MARGOLIS
OF STAFF

SACRAMENTO, Calif. — Last month, as he pronounced sentences on a mother convicted of battering her 8-year-old son to death, a judge in New York City verbally indicted the local social services system, which knew of the abuse but was too overburdened to respond in time.

Last week, IBM outsourcing subsidiary Integrated Systems Corp. (ISC) and the State of California Department of Social Services (DSS) signed an \$80 million outsourcing contract aimed at making sure no such tragedy occurs in the Golden State.

Under its terms, ISC will design, build and run a child welfare case-management system that will link 4,500 IBM Personal System/2s into a 160-location Token Ring network to be placed at the round-the-clock service of some 9,800 social workers throughout the state's 58 counties.

The client/server architecture will allow users in each of the larger counties to access an IBM mainframe at ISC's Boulder, Colo., data center via server. Smaller counties will have a direct link to Boulder. Some 80 ISC staffers will work on the implementation; others will run the system, once it is built.

The combined outsourcing, systems integration and development pact marks ISC's debut in the public-sector services market, one of the vertical industries the firm targeted when it was spun off from IBM last May. It also gives California the nation's first fully automated child protection system.

"For the first time a case worker who goes out on an emergency referral will have access to child and family information, case history, court data — all the relevant information," said Diane Jung, chief of the Family & Children's Services branch of the DSS.

Almost as important, Jung added, "social workers will be able to manage their case loads. Line management will be able to oversee the [child protection] program." All in all, "the state will have a better grip on what we need to do to protect our kids," she said.

The state's primary thrust of the program is to identify problems early on, with the goal of keeping families together or reuniting them as quickly as possible after problems have occurred," said John Healy, interim director of DSS.

After 4½ years spent intensively working on the concept, the system will be piloted in three counties in the spring of 1993, with a one-year total rollout to follow, Jung said.



Delivery on track

IBM executives speaking at the PC Forum last week reaffirmed that delivery of OS/2 Version 2.0 is on schedule.

"There aren't any of us who don't wish the first year was longer. But they will deliver in March," said James Cannovino, IBM vice president and general manager of Personal Systems.

Bernard Serrat, an assistant general manager in Cannovino's division, said the plan is to first deliver 2.0 by downloading it electronically to corporate customers. IBM used the same approach with initial deliveries of its limited availability code, following up with shrink-wrapped versions a few weeks later.

"We will begin with our points of strength," Serrat said. "The first target is not to make sure there's a box in every little store. There'll be very focused marketing in the corporate arena. It is our strength and a weakness of some of our competitors." However, Serrat said, there will also be promotions and pricing to reach consumers "from Day 1."

ROSEMARY HAMILTON

Microsoft glitches irk user

CONTINUED FROM PAGE 1

ory model, to accommodate existing users. Version 3.0 is due out in the second quarter of this year and will correct the problem, Microsoft said.

Microsoft acknowledged that because Consumer Software's Network Courier mail package was recompiled into Microsoft Mail with the small memory model, "we do have problems reading large messages; there's no question," said John Ditz, product support lead for Microsoft Mail. He said Microsoft Mail distributions to 600 to 700 users are not uncommon, as each post office can accommodate up to 500 users.

Shared bytes: Ditz explained that the 25K bytes of space in a Microsoft Mail Windows client are shared between a "read" and "compose" window. Those 25K bytes are insufficient if a user has 100 messages of 1K byte each in his "in-box" and needs to find another 10K bytes to forward a message.

Ditz suggested that customers experiencing the memory problem make use of the Windows Clipboard. He said users

can close the message down, bring up a new window, cut and paste the old message and re-select message recipients. Pereira noted, however, that the process of manually reselecting users "takes more than a while" in an installation of his size.

The computing services manager for the business college at Oregon State University said he overcomes the buffer problem by sending documents created within other applications as attachments.

Greg Scott, who supervises the Corvallis, Ore.-based institution's network, said, "The buffer problem has to do with the amount of things you have open on the screen. You don't run into it if you create a separate file and send it as a mail attachment."

It is not clear yet what a networkwide upgrade to 3.0 would cost. Ontario Hydro, the university or other users. A Microsoft spokeswoman said that as yet, pricing for 2.1 to 3.0 upgrades is undetermined, though upgrades for companies that purchased 2.1 after Jan. 1, 1992, will be free of charge. Pereira, Scott and other users said they haven't been told about pricing.

IBM uncovers bogus parts

CONTINUED FROM PAGE 1

cations Network Architects, Inc., a consulting firm in Washington, D.C., nonetheless ruled out the possibility in this case.

"We are talking whole unit systems, and that makes critical error impossible. It definitely points to malicious intent," Debeck claimed.

IBM sent a letter to authorized AS/400 dealers in mid-February, stating that some of the duplicate serial numbers had surfaced in B models found in both customer and third-party locations and that in some instances, some of these units "have been presented as genuine IBM machines."

The letter goes on to state that no maintenance services, including hourly per call, sale of parts or engineering support, will be provided for such machines. Furthermore, IBM will not provide Model Update Licensed Internal Code, or the "brains" of the processor, for these systems.

The vendor met with the American Society of Computer Dealers (ASCD) in mid-February to help rectify the situation with a "minimum of disruption" to customers. The ASCD sent out a letter in conjunction with the above-mentioned IBM notice stating that it is a "violation of the Code of Ethics for members not to knowingly purchase, sell or trade" the models in question.

IBM has clamped down on spare parts and used equipment violations in the past year, for example, in its memory-board suit against Comdico, Inc. and others. However, this latest discovery is all part of an audit process kicked off about two years ago, Dumbek said.

"IBM is looking for every single dollar right now. Field engineers started to examine serial numbers on a site-by-site basis to find out all kinds of things. Basically, this is cleaning up a lot of sloppiness, but sometimes you actually uncover overt acts of

theft," he said.

One analyst speculated that some of the confusion could have occurred during B to D model upgrades at various sites since the D model introductions last spring. After these upgrades, many of the older B model components may have been left by IBM field engineers at customer sites, said William Sines, director of midrange systems research at Technology Investment Strategies Corp. Customers, feeling that these parts were indeed theirs, may have sold them to others, Sines said.

Joseph Marini, ASCD executive director, concurs. During B to D upgrades, one processor is literally rolled out and another is rolled in. Marini said, "My understanding is that IBM sends a trucking company out to pick up the other processor. Obviously, these situations occurred before the unit could be picked up."

IBM declined to comment on this possible explanation, pending the results of its investigation. "As far as we know, this is a very, very isolated incident," Grimes said.

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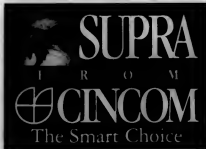


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Users expect modular network pieces

Part II of a two-part series on the future of network operating system software.

BY JIM NASH
CW STAFF

Looking just over the horizon, network managers see a gradual industrywide shift in the use of network operating systems away from sharing resources and toward connecting multiple vendors' equipment and applications.

Users said they expect to see the availability of networking functions that can be run interchangeably on the desktop or server operating system. However, a wholesale switch to networks that support virtually any vendor's products probably is a "utopian" notion, said Scott Dyars, manager of technology planning at Georgia Pacific Corp. in Atlanta. "I don't know that things will ever get that modular, but it's an attractive model," he said.

Managers also said they expect they will be able to mix and match features, adding flexibility to their networks, if not savings. A company needing a minimum of services would save money if it were not forced to buy current networking packages, the managers agreed.

"As you move into the client/server environment, the network operating system is going to change to be more like the mainframe," said Tony Berger, director of information systems at Jamison Tim-

ber Co. in Seattle. "You will be able to add on services as you need them... not buy a whole package."

Most network managers agreed these changes will do little to reduce their work load and stress during the next three to five years. They are resigned to this situation, however, seeing it as the price of working with evolving technology.

The evolution in network operating systems will be slow because of Novell, Inc.'s command of the local-area network market, managers said in interviews last week. Novell's network operating system, NetWare, is in fact an operating system that uses MS-DOS to load itself on desktop computers. As such, it fits the general description of the future system, with a couple of notable exceptions.

One is that many of its key features are handled with the two principal versions, 2 and 3. In the future, industry observers predicted, more features will be cleaved. A second exception is the general reluctance Novell has shown to throwing open its doors to other vendors' products.

It "isn't in Novell's best interest to be that open at this point. Right now, they are finding out what connectivity priorities their customers have and forming relationships with those vendors," Dyars said.

Demand for that much openness may not have reached critical mass, said John Cook, network coordinator at Price Wa-

terhouse in Houston. IBM and Microsoft Corp.'s jointly developed OS/2 was touted as a step in the direction of an operating system that is more open to other vendors' products, networking and otherwise. "But OS/2 hasn't taken off. It's a nice environment, but its [promises] are fading in the sky," Cook said.

That is not to say demand is not vehement in some quarters. "We would like to see architectural changes in network operating systems to allow them to integrate with others" in a mix-and-match way, said Steve Altias, corporate vice president of systems at New York Life Insurance Co. in New York.

Doing so would solve problems of het-

erogeneous workplaces such as a lack of interoperability, multiple systems to manage and redundant hardware, most users agreed, by integrating the many systems in most large companies.

Better system management would follow once network managers did not have to treat most major systems as discrete. But they agreed that greater control over existing networks would only result in a ratcheting of complexity all over again at the network level.

Altias lamented, "Things will only get more complicated. We get better tools, and somebody builds more complex systems."

Berger, a traditional mainframer, said he will welcome the changes in networks. "But it means we have to relearn a lot of stuff we already know. It's just different hardware, different standards."

Mellon reviews outsourcing role

BY CLINTON WILDER
CW STAFF

PITTSBURGH — With the rough-and-ready outsourcing market growing more competitive by the day, the new information systems chief at Mellon Bank Corp. is reconsidering the bank's role as a provider of outsourcing services.

"I am not sure yet about this market," said Brian C. Shah, who officially takes over today as Mellon's new executive vice president of information management and research. "I have seen a lot of things come and go in this business, and I want to be very sure [of outsourcing market growth] before we put a lot of resources toward it." Shah said Mellon will decide its future role in outsourcing in the next several months.

Shah's comments come at a time when Mellon is trying to cope with the business failure of its largest outsourcing customer to date, Dollar Dry Dock Bank in White Plains, N.Y. The immediate impact on Mellon's six- to seven-year outsourcing contract with that bank is not clear. Mellon executives were discussing data processing options last week with Emigrant Savings Bank, the New York bank that will acquire Dollar Dry Dock's assets in a move recently approved by the Federal Deposit Insurance Corp.

Mellon was a successful vendor of processing services to smaller banks and thrifts long before the current outsourcing craze. But during the past three years, Mellon, with the exception of Dollar Dry Dock, has failed to win the types of major deals landed by competitors such as IBM's Integrated Systems Solutions Corp. (ISSC) and Electronic Data Systems Corp. (EDS), for example, has landed contracts with seven banks larger than Dollar Dry Dock since it entered the business in 1989.

"Mellon has been aggressively pursuing a lot of contracts, but it is very expensive to chase these deals," said Perry Harris, director of management strategies at The Yankee Group, a Boston-based market research firm.

Last week, Mellon's processing of Dollar Dry Dock data was "business as usual," said David Moore, senior vice president of information processing at Mellon. But the future of the deal is uncertain at this point. Allan Woods, executive vice president and head of Mellon's outsourcing business, was unavailable to dis-

Banking on outsourcing?

Mellon and M&J Data are head units competing with outsourcing giants

Weaknesses noted by consultant reviews as of December 1991 (in millions)

IS	\$700
Synthetic, Inc.	\$240
IBM (ISG)	\$140
Flare, Inc.	\$125
Perf Systems Corp.	\$60
Revised	\$40
M&J Data Services, Inc.	\$35
Mellon Information Services	\$30
EDS	\$20

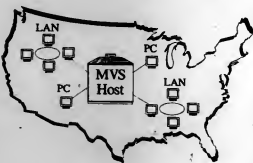
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cus specifics of the Dollar Dry Dock contract.

The Dollar Dry Dock experience points up an increasing hazard for outsourcing vendors: the financial health of their customers. Since the best candidates for outsourcing are firms experiencing a fiscal crunch, vendors may take a risk by signing up long-term contracts.

Mellon knew that Dollar Dry Dock "wasn't the healthiest bank in the world," said George DiNardo, the former Mellon IS chief who was instrumental in landing the contract in October 1990. "That's the risk in all outsourcing. Do you outsource when you're healthy? Maybe. But usually it's a fox cost control."

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Michigan bank issues check image statements

BY ILLIS BOOKER
CW STAFF

FARMINGTON HILLS, Mich. — Starting this month at Michigan National Bank, some customers will receive images of their cleared checks instead of the paper originals.

The \$10.6 billion, 190-branch bank will be the first in the country to deploy IBM's Check Imaging System, which will become commercially available at the end of this quarter. Fleet/Norstar Financial Group, Inc. in Rhode Island will kick off a similar service using IBM's system next month to 25,000 Rhode Island custom-

ers. It will roll out the service to its entire clientele next year. BayBank, Inc., based in Massachusetts, is expected to follow suit shortly.

"The advantage is a better product for retail customers who want to see their checks," said Charles W. Kight, Michigan National's executive vice president of operation and information technology.

Currently, only about 20% of those customers have their checks returned. The majority choose to have the bank keep the paper checks, an option called "safekeeping," because this service costs less.

But when the CheckImages statement

option is made available this Thursday, customers who maintain a minimum balance will not pay extra to see their checks, Kight said. Some 300,000 of the bank's accounts are eligible for the conversion to image statements.

IBM's mainframe-based Check Imaging System, which comes as an enhancement to IBM's Item Processing System for banks, is one of a handful of products vying for a piece of this emerging application market. The image statement module of Unisys Corp.'s InfoImage Item Processing System is already available. This month, Detroit-based Comerica Bank will announce availability of its

CheckPhoto service statewide.

According to Lisa P. Hane, editor of "Item Processing Report," a biweekly newsletter based in Potomac, Md., imaging is advantageous to banks because it reduces the labor costs of sorting checks for mailing as well as the cost of the mailing itself. "Instead of mailing back 10 or 20 checks, they can send a few 8 1/2- by 11-in. paper sheets," she said. CheckImages will display 10 half-size canceled checks, arranged numerically, per sheet of letter-size paper.

Because their format is digital, Hane explained, image statements can be sorted or modified to meet the needs of special customers. For example, check images could be enlarged for customers with poor vision.

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- 3090 running NYS/ESA.
- DB2.
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- Statement application program.

Total cost: \$500,000

CW Chart: Michael Sigman

Interestingly, Michigan National will still rely on an old technology, micrographics, to take pictures of all incoming checks for internal processing.

"In the long term, as the technology improves and the costs [of image capture] decline, we'll do both processes with electronic imaging," Kight said.

Interest in image statements among banking institutions is strong, according to a study conducted in late 1990 by Wayne, Pa.-based TransData, the research division of New York-based publishing house American Banker.

The study found that almost one-third of the 3,300 banks and thrifts with \$125 million or more in deposits had a high level of interest in electronic image technology, such as image statements applications.

The TransData analysis also found that a majority of consumers said they would prefer a returned-check imaging system over either having their actual checks returned or having the bank hold the physical check and send a statement alone.

Check image statements may, in fact, be the first step in a fully on-line environment whereby customers would access the bank's systems directly from their own personal computers, obviating the need to mail any paper documents.

But whether an on-line capability is in the cards for IBM's imaging product, the company is not saying.

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How many applications will your PC(s) run in a typical workday? _____

What best describes the type of work the system will be used for?

(Check all that apply):

- | | | |
|--|---|--|
| <input type="checkbox"/> Word Processing | <input type="checkbox"/> Desktop Publishing | <input type="checkbox"/> Scientific Research |
| <input type="checkbox"/> Order-entry | <input type="checkbox"/> Education | <input type="checkbox"/> Software Development |
| <input type="checkbox"/> Database (filing records) | <input type="checkbox"/> Design (CAD/CAM) | <input type="checkbox"/> E-Mail |
| <input type="checkbox"/> Financial Calculations | <input type="checkbox"/> Engineering | <input type="checkbox"/> Other industry-specific applications (please specify) |
| <input type="checkbox"/> Retail Store Management | <input type="checkbox"/> Industrial Process Control | |

How many people work in your group, department or small business?

☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:

☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX™ ☐ Other

Which of the following graphics-oriented applications best describes your needs?

(Check all that apply)

- | | | |
|---|--|--|
| <input type="checkbox"/> Desktop Publishing | <input type="checkbox"/> Realtime Modeling | <input type="checkbox"/> AutoCad |
| <input type="checkbox"/> CAD/CAM | <input type="checkbox"/> Animation | <input type="checkbox"/> Business Graphics |
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LAN Communication

How many PCs do you have installed? _____. From how many manufacturers? _____

What kinds of connections does your PC(s) require? (Check all that apply)

- ☐ Links with other PCs in the immediate surroundings
☐ Connection to the local area network (LAN) throughout a building
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ADVANCED TECHNOLOGY

University library enters information age

Project Mercury, based on distributed computing, takes library resources to the home and office electronically

BY MICHAEL ALEXANDER
CIVIL

Carnegie Mellon University in Pittsburgh last week officially launched Project Mercury, one of the nation's first electronic library systems based on distributed computing.

Universities have moved swiftly in recent years to bring their libraries into the information age, usually starting with electronic catalog systems. The ultimate goal, which is only now partially realized, is to put all of a library's contents on-line and make them accessible from anywhere, on campus and beyond.

"The research library is the center of [the] university, and the quality of what they do has major impact on [the] quality of teaching and research," said William Arms, Carnegie Mellon's vice president for academic services. "I don't normally work in a library but in an office; if the materials in the library are accessible from the office and home that means I can use it more effectively."

Electronic libraries are also intended to make it easier to find materials, help forestall having to build costly new facilities and also make it possible for several people to simultaneously access an electronic copy of a single book or other resource.

Some universities, such as Cornell University, have been experimenting with electronic libraries built around mainframe computers [CW, Nov. 19, 1990]. That approach is not without

drawbacks, Arms said.

"We opted for a distributed computing system in part to harness computers that are on desktops throughout the university," he said. The primary limitation of using mainframes as a central repository for a library is that mainframe systems can be difficult to build upon as the library's holdings grow.

The system developed under the Project Mercury program enables students and faculty to search out and retrieve electronic documents stored in the university library "from almost any type of computer, anywhere on campus, without leaving their dorm room or offices," said Thomas Dopirak, technical director of Project Mercury. The project is still in the experimental phase and will not be completed for several years, he said.

At the core of the system are four Digital Equipment Corp. DECStation 5000 database servers running DEC's Ultrix iteration of Unix. Linked to the servers are workstations and terminals. The researchers have been testing an experimental version of an X.11 Motif interface, specifically designed to enable users to retrieve text and bit-mapped images of documents.

Once a search yields an index entry, an image button indicates that the

document is available. Dopirak explained. Clicking the button displays the first page, typically within two seconds, including transmission and decompression, on a DECStation

to distribute information," said Barbara Richards, interim director of university libraries. "Now distributing electronically produced information may prove to be more cost-effective."

The university has on-line 27,000 pages from seven journals on computer science published by Elsevier Science Publishing and the IEEE. Eventually, millions of pages, as well as multimedia applications that incorporate audio and video, will be available through Project Mercury, Arms said.

Documents are currently being stored on hard disks. As the collection grows, the documents will also be stored on optical discs. The university is already testing a compact disc/read-only memory (CD-ROM) jukebox that holds 240 CD-ROMs.

The original aim of Project Mercury was to build an electronic library based on literature in artificial intelligence. However, priorities were changed to create a general-purpose, campus-wide library system for collections in specific disciplines and as part of a national electronic library.

University researchers were careful to use standard formats and protocols in the system as the first step in enabling libraries around the world to share information, Dopirak said.



Robert M. Schuchman

3100, he said. A second Motif interface designed to allow users to browse through a journal page by page is also being developed. Also under way is an interface for Apple Computer, Inc. Macintosh computers.

"For years, print has been the way

to share information, Dopirak said.

U.S. R&D spending hits an economic skid

BY MICHAEL ALEXANDER
CIVIL

Spending in the U.S. for research and development is heading down for the first time since the 1970s, while the nation's four closest industrial competitors are boosting their investments in research, according to a new study published by a federal agency.

An ailing economy and a meltdown in the Cold War are putting the brakes on the growth of R&D spending, according to the National Science Board's (NSB) recent report. The average annual increase in total U.S. spending between 1985 and 1991 in constant dollars was 1.2%, compared with an annual growth rate of 6.9% between 1980 and 1985, the NSB said. The most recent estimates on change from 1989 to 1991 also indicate that R&D spending is declining.

Current estimates for development expenditures showed the sharpest decline of a negative trend in constant

dollars since 1988. The estimated trend in applied research has also been heading downward since 1989, the NSB said. The federal govern-

ment is estimated to have reduced its R&D spending significantly from 1989 to 1991; however, U.S. industry R&D spending remained level during

the same period.

The U.S. is still outpacing Japan, Germany, France and the UK—its four closest business competitors. However, Japan and Germany lead the U.S. in terms of R&D expenditures as a percentage of gross national product.

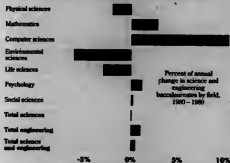
The four countries together spent 12% more than the U.S. on total non-defense-related activities.

The U.S. is slowly losing global market share for its high-technology products, the NSB said. For example, in 1988 the U.S. supplied 37% of the world's high-technology products, slightly down from 40% in 1980.

Employment of science and engineering workers continued to grow at an annual rate of about 4%. The supply of new scientists and engineers during the 1990s is likely to decline because fewer U.S. citizens are expected to pursue science and engineering careers.

However, data on freshmen entering college in 1989 and 1990 suggest that degrees sought in natural sciences, engineering and computer sciences might begin to increase in the early 1990s, the NSB said.

Computer sciences degree scores biggest gains



Source: National Science Board

EDITORIAL

Confessions

Do you recall which airline was the first to offer a frequent flier program? Neither do I. Not only that, you probably don't care because all the major airlines have one. So what does it matter who was first or second or who was late?

If you want to determine which program is best, you'd need a Cray-2 to crunch the data from the myriad of features and permutations of each one. Then, after this careful analysis, you'll book yourself on one of the airlines on your short list, which was composed based on how well each airline serves your needs as a frequent flier, not on the strength of its frequent flier program. Anyway, they're too damned hard to figure out.

And so it is with the selection of so many information technology products, particularly for the desktop. Product features boggle the mind, while the press, including us, pepper our pages with extensive coverage of who's late with what product this week.

Take word processing, the most common and intensely used desktop application. Everyone was so concerned about how "late" market-leading WordPerfect was with the Windows version of its product—everyone except perhaps the customers, who clearly were not about to switch vendors just to obtain new features for which they could well afford to wait.

Or how about PC spreadsheets? A couple of years back, we in the press sacrificed acres of good forest land to let everyone know about the importance of the fact that Lotus was so late bringing 1-2-3 Version 3.0 to market. Last November, Lotus claimed 90% of the DOS spreadsheet market for the month, its highest market share ever. Obviously, customers weren't too badly shaken by the headlines.

Or take Windows itself. Talk about late. It took four years for Microsoft to publish a version of Windows that would do what the company said it would when first announcing it. What a terrible problem it was for Microsoft, which has sold a mere 10 million copies in two years and which reportedly has a market value greater than that of General Motors.

There are two points in this admitted self-analysis. The first is that both the press and analyst communities could do a better job helping users by more thoughtfully considering what's really important to users. Whiz-bang technology features of new products should take a back seat in importance to the ability to integrate the products into a networked environment.

The second point is that, as with the selection of an airline, customers will largely look beyond the glitz and go for the comfort zone, whatever that may be for the individual customer. How else could you explain the resilient market dominance of key vendors in the face of all their glaring "mistakes"?

Bill Laberis

Bill Laberis, Editor in Chief

COMPUTER VIRUS DATES TO BE ANNOY OF



LETTERS TO THE EDITOR

Writer not up front about front ends...

I am writing in regard to Jesse Berst's column "Focusing on client/server" (CW, Feb. 17). As near as I can make out, Berst is doing promotional work for Microsoft Corp. rather than reporting on client/server techniques.

What about the differences between cooperative and distributed processing? What about communication and application services based on the client/server model? How about information on the pitfalls of this model, such as journaling, redundancy and concurrency?

It appears, after reading the article, that Windows is the only possible front end to use. What about OS/2, X Window System, GEM or even good old MS-DOS? A fair case can be made that Windows 3.0 is about the worst front end for a client/server application.

Please try to present both sides. There's a great deal of decision-making being done with sketchy information. PC support specialists and LAN administrators do not have all the answers.

OOP will revolutionize software design

Martin Goetz's article on object-oriented programming (OOP), "Object orientation not cure for IS headaches" (CW, Jan. 13), left me both confused and dismayed.

There are few technologies available to the IS professional that hold as much promise as object orientation. This emerging technology, long practiced and valued by computer scientists, will revolutionize the way commercial and business software is designed, produced and maintained.

Far from obscuring the design process and accelerating

Neither do organizations such as Microsoft, Borland and Oracle.

Jerry Golick
Montreal

... and provides dubious statistic

Regarding Jesse Berst's commentary (CW, Feb. 17), I completely agree with the spirit of everything that he said in the article. However, I was intrigued by the assertion he accredited to Forrester Research, Inc.

All of the surveys I have ever read indicate that however you wish to measure cost/performance (including cost/sent), "high-performance" Unix systems are less expensive than mainframes. I am eager to see the definitions that Forrester Research used, and the justification for the apparent 200% disparity quoted.

G. E. Scott
Computer Horizons Corp.
Phoenix

maintenance requirements, OOP offers an alternate vision of software dynamics based on several clearly obtainable objectives: simplicity, clarity, reusability and robustness.

Object-oriented analysis is hardly a "massive task"; rather, it is a natural evolution of the systems analysis and knowledge elicitation process that modern fourth- and fifth-generation systems require.

Earl Cox
Founder and chief scientist
Knowledge Based Technologies
Chappaqua, N.Y.

No miracle worker

It is clear that there are some users of integrated computer-aided software engineering (I-CASE) who are disappointed with the experience for the reason you identify in "Reports from front end fuel anti-CASE fire" (CW, Feb. 10).

However, it is important to realize that effective I-CASE use represents a paradigm shift for developers equal to that of the one needed by first-time computer users. Using I-CASE effectively means that we must become excellent at comprehending our clients' activities and needs. No tool or methodology can make that happen entirely.

Careful planning and impact assessment is clearly essential, as would be the case (pun intended) with any new technology. As with other technical "failures" I have seen, we should look at what we in IS have and haven't done to improve our skills before blaming others.

Jason Smith
Aluma-Systems Corp.
Toronto

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor in Chief, Computerworld, P.O. Box 9171, 375 Cockburn Road, Framingham, Mass. 01701. Fax number: (508) 875-8831; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

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These alliances aren't forever

ALAN H. MELNICOE



If licenses were required for business alliances, there would be a long line at Silicon Valley City Hall. Every day the newspapers seem to carry an article about U.S. high-technology companies pooling resources to develop or market new technology. My guess, however, is that this new era of cooperation is likely to last about as long as one of Lis Taylor's marriages.

Since Apple and IBM's 1991 decision to jointly develop an operating system—which was about as stunningly unexpected as the collapse of communism—we've seen a steady stream of announcements.

Not long thereafter, the Advanced Computing Environment alliance brought together a number of rivals to work together on development of advanced RISC computers. More recently, joint development deals were struck between Unisys and Motorola, Hewlett-Packard and Informix, Gray Research and Sun, and Northern Telecom and Motorola. Even longtime adversaries Sun and HP agreed to cooperate on software standards.

IBM has been joint-venturing or investing in just about every competitor that could hold a pen to sign a joint-venture agreement. Supercomputing Intel recently inked a deal with Sharp to build an \$800 million factory in Japan for the production of flash memory chips.

The once fiercely competitive Apple is also reported to be on the verge of a strategic alliance

with Sharp for the joint design and manufacture of miniature pen-based computers, and it has instituted a technology alliance with Sony.

Sign of the Times

These new alliances, often among formerly staunch competitors, appear to be a response to technology maturity, the effective use of joint technology development by the Japanese and the enormous legal bills incurred in the prior, more litigious era. Yet I doubt this newfound cooperation will last long or produce many technical advances.

Americans, unlike the risk-averse Japanese, like to operate on their own and fight, rather than cooperate, with their competition. This propensity explains, in part, why Sematech and other consortia for joint technology development have been largely unsuccessful.

The prospect of easy profits from patent and copyright royalties is also a difficult lure for high-tech firms to resist, especially if their technologies are aging.

Hayes recently prevailed in patent infringement suits against Everex, VenTel and Omnitel and can be expected to pursue collection of royalties from all makers of Hayes-compatible modems. Rodime, a long-forgotten name in disk drive technology, is suing or demanding royalties from virtually all makers of PC hard drives.

Semiconductor pioneer Tex-

as Instruments already earns more from licensing fees (\$256 million in 1991) than from operations. IBM has been doggedly pursuing all PC clone makers for



patent royalties. Lotus is suing Borland for allegedly pilfering its spreadsheet command structure, and AT&T, the once magnificent inventor of the transistor and the semiconductor, has ousted off its ancient patents to demand royalties from semiconductor manufacturers.

The stakes in patent and copyright battles are substantial. In its copyright infringement suit against Microsoft and HP for alleged infringement of the Macintosh user interface, Apple estimates its damages to be about \$4.3 billion. While this may be inflated, Honeywell recently was a

\$96 million judgment against Microsoft for infringing on its patented antisniff technology. Furthermore, when it can be proved that infringement was intentional, triple damages may be awarded.

At the very least, we can expect to see companies moving to prevent competitors from raiding their technology by enticing away key engineers and programmers. For example, IBM recently obtained an injunction against Seagate for allegedly pirating disk drive component technology by luring away a former IBM engineer.

It is also possible that the law is being broadened for a resurgence of antitrust suits. Although this once-forgotten area of the law has been long dormant, it may be invoked frequently during the next few years both for the traditional reason of attacking industry leaders and as a means of blocking deals between competitors.

It was only the evidence of a coming trend. Tandy recently filed an antitrust counterclaim to TI's suit against it for alleged patent infringement. Advanced Micro Devices also filed an antitrust claim against Intel in the companies' long-running dispute over microprocessor technology.

Don't let all the recent billing and cooking fool you. Very few of the partners in these alliances are ready to give up their fighting ways.

Melnicoe heads the technology financing department of Pricewaterhouse Coopers, Inc., a San Jose, Calif., law firm.

Taking the mystery out of reading high-tech fine print.

MICHAEL CORN



We know them by heart: "Void where prohibited..." See your travel agent for details... Excluded on tax, title and destination charges... Your mileage may vary... Some restrictions apply... It's the fine print that keeps American business in business. Without it, you wouldn't have to be 18 or over to enter. Baticures would always be included. And you could do whatever you wanted, even in Alaska, Hawaii and Puerto Rico.

Airlines and auto dealers aren't the only ones who fool with fine print. We high-tech

folks have messed with a micro-second font or two. Sometimes we hide it under an asterisk. Sometimes we write it in hex. But let the buyer beware. Ads for PCs, software and technical equipment are full of these hidden little extra conditions.

As a public service, I'm committing to expose the following common examples. Here are some technology-related ads you might see, along with the attached fine print you might not:

- We give you the attention you expect from a small business, with the vision you expect from a big business. (That's because we're not a big shirt last year, we're a big business.)
- No other company can deliver the systems, service and support. (Which should scare the

daylights out of you, since we plan to subcontract the whole project.)

• When it comes to developing software, there's no substitute for quality. (But we've never tried like back to find one.)

• Job hunting? Ask the last five CEOs we've placed about our exclusive recruiting and placement services. (That won't take long. It's the same guy.)

• We have more installations than anybody... and 10,000 customers can't be wrong. (Although a few of them aren't that prof.)

• When it comes to software support, we're behind you all the way. (At least one generation behind.)

• Voted the highest customer satisfaction three years running. (It's when the system's not running that we're worried about.)

• IS professionals: Looking for a job with more challenge? More responsibility? More visibility? More MONEY? Then look no

further (... than the part about more responsibility.)

• The right system today and the right system for the future. (So pay us today, and we'll write something for you in the future.)

• Remember, if you buy a cheap network solution, you get what you pay for! Why not buy our comprehensive network solution? (And not get what you pay for.)

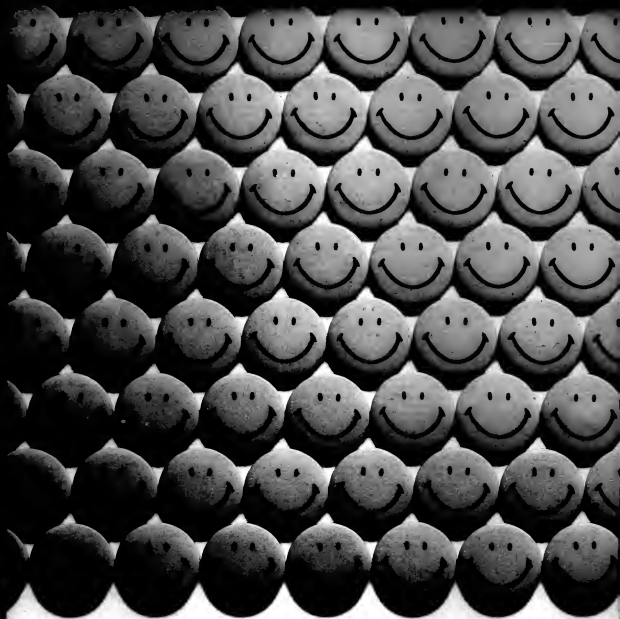
• System down? Are you in the hot seat? Call the vendor with you pay for! Why not buy our comprehensive network solution? (And not get what you pay for.)

• What you need is an established leader who combines the hardware, software, operating system, network and services in one total, seamless solution. (But once you hear the total, it'll seem less like a solution.)

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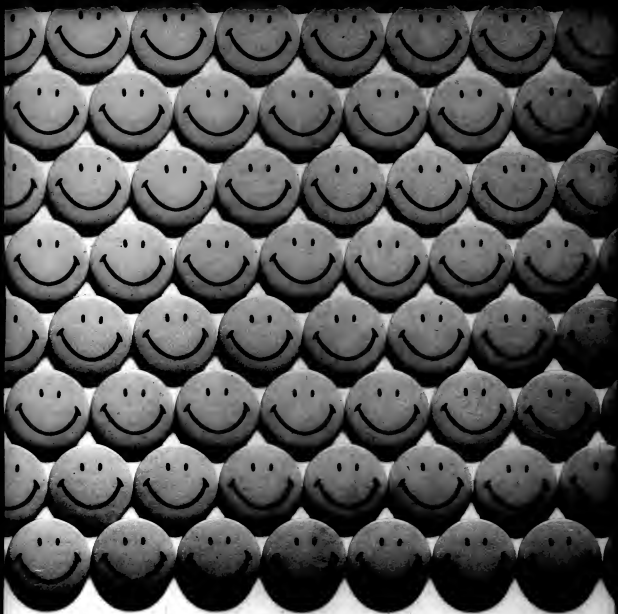
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The AS/400 is a roaring success and for companies of all sizes. Harley Davidson, NIKE, Porsche, Royal Caribbean Cruises, and Waste Management are among thousands whose competitive strategies are built around

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Besides running a huge library of tailored business applications, it is optimized for *advanced* applications—like image, telephony and expert systems—to separate you from the pack in a hurry.

And the entire line of AS/400s has just been refreshed, with good news on all fronts—price/performance, openness, systems manage-



AS/400 owners look alike?

ment, ease of use, development tools and more. (In fact, our new E10 model leads the industry in price/performance, based on TPC-A benchmark standards.)

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Frankly, paying anything at all is pretty nauseating.

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Then you pay again. For upgrades. Or quarterly "updates."

But even that doesn't buy you much peace of mind. Because each new day brings an average of six new viruses into the world.

Which means all anti-virus programs are inherently obsolete.

Except one.

Introducing Untouchable™. The only software in the world that gives you 100% protection.

Today.

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Like other anti-virus software, Untouchable is equipped with a TSR monitor for patrolling your system memory plus a scanner/remover for examining the files on your disk.

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Only Untouchable Network gives you centralized virus protection.

Now you can install, monitor and control without having to leave your seat.

recognize and obliterate hundreds of the little buggers — enough to protect you from 95% of the potential carnage.

If you find that statistic reassuring, then you probably like the odds in Russian Roulette.

If you don't, you'll want to

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IN BRIEF

Super SX launched

■ Supercomputers, Inc., based in Redmond, Wash., recently announced the Super SX, an upgrade card designed to let users of Compaq Computer Corp. Desktop 286-12s and AST Research, Inc. Premium286 computers upgrade to a 25-MHz 386SX performance. The Super SX uses an Advanced Micro Devices, Inc. 25-MHz 386SX core. Introductory pricing for the Super SX for Compaq is \$498 (\$598 after March 31) and \$440 for a special Compaq interface. The AST version will ship in April and will cost \$598.

■ The Canadian Broadcasting Corp. (CBC) will base the building directory for its new Canadian Broadcasting Center on a network of 40 Amiga 3000 computers from Commodore Business Machines, Inc. The CBC guide will use an interactive touch-screen design that locates individuals, departments or project teams and will give animated directions in French or English. The CBC predicted that a multimedia building directory will make it easier to locate its 3,200 employees than it is with traditional physical signs. Separately, Commodore announced a \$500 rebate program for purchasers of the Amiga 3000.

Virginia Blue Cross not singing PC blues

Development moves from mainframe to desktop

BY CHRISTOPHER LINDQUIST
OF STAFF

Increasing competition, a recession, threats of heavy-handed government intervention: If this sounds like a recipe that could give an industry an upset stomach, you're right. And the health insurance industry is finding itself right in the middle of the soup.

At Blue Cross/Blue Shield of Virginia, these ingredients add to the normal pressure that the information systems department is feeling to get systems out more quickly and with higher quality. One of the primary ways the firm is doing this is by shifting from mainframe-based development and maintenance to a personal computer-based envi-

ronment. It was a slow process, but the benefits are beginning to show.

About two years ago, the insurer brought in KnowledgeWare, Inc.'s Information Engineering Workbench computer-aided software engineering (CASE) tools to aid in development. While it took more than six months to overcome the learning curve, the results were worth the effort.

One of the notable paybacks from CASE came from being able to generate prototype applications quickly by having the compilation and test environments on the PC. "There are so many points of contact and so many approval processes that you're doing an awful lot of

Continued on page 42



Cumulus brings graphical look to Unix

BY JAMES DALY
OF STAFF

PALO ALTO, Calif. — Unix users who labor through character-mode screen displays while they jealously eye those who zip along on personal computers sporting easy-to-use graphical interfaces may be in for a break.

Recently, Cumulus Technology Corp. announced its AlphaWindow Terminal, a hardware and software package that promises to provide character terminal users with all the advantages of a PC windowing environment without the cost and maintenance associated with X Window System terminals.

Cumulus officials said AlphaWindow Terminal will run virtu-

ally all existing character-based Unix applications without modification and will provide such popular windowing features as multitasking, pop-up windows, pull-down menus and the use of a mouse.

Virtually transparent

According to the vendor, the terminal is the first one based on the new AlphaWindow standard from the Display Industry Association, a group of 26 terminal and system software vendors. With the AlphaWindow approach, each open application is assigned a virtual screen that responds as if it were a full-size character-mode display. Thus, the process is transparent to the user. The virtual screens can be

managed to appear on the actual display screen as windows of any shape, size or priority.

Cumulus' AlphaWindow Terminal is similar in concept to the X Window System developed at MIT. Both provide graphical interfaces that allow users to perform tasks quickly and intuitively while foregoing cryptic command-line interfaces and hard to remember function-key commands.

The result is that vendors can deliver sets of applications with similar looks and styles, lower users' learning time and increase their productivity.

Because the AlphaWindow package does not provide the level of graphics in X, it is not nearly as costly. Whereas the

cost of each X terminal on a network might average out to about \$1,200, the cost-per-terminal for a typical multiuser configuration of AlphaWindow averages around \$650, said Bart Broussard, Cumulus' director of marketing.

The key to the Cumulus package is the Window Manager, which enables users to design their interface to resemble either Microsoft Corp.'s Windows or the Open Software Foundation's Motif interface. Additionally, the AlphaWindow Terminal supports up to 16 sessions and 22 windows, each running different applications.

Pricing is \$759 for the terminal, which includes a high-resolution 15-in. display, and \$459 for the limited license software. Units are scheduled to ship this spring.

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When it comes to enterprisewide connectivity, not all e-mail systems work quite the same way.

While a lot of LAN-based electronic messaging systems provide connectivity across a variety of computing platforms, many don't do a very good job of it. The fact is that connectivity with poor performance is like not having any connectivity at all.

Electronic mail is quickly becoming a mission-critical component of day-to-day operations for many businesses. Despite this, research indicates that about 90% of all Fortune 1000 corporations can't communicate across their disconnected e-mail systems!

This underscores how difficult it is to achieve quality connectivity in today's corporate environment. The reality is that LAN-based e-mail systems must be able to work in a robust fashion with an organization's existing LAN, minicomputer and mainframe systems.

What makes things even more complex is that technology is still in transition, so any connectivity decision you make today must

also include an assessment of the future and how you plan to get your company there. Which means the pressure to architect an optimal long-term solution is extremely high.

If you're responsible for implementing and managing

LAN-based systems, you should look beyond simple "checklist" connectivity and ask some very difficult questions. Questions like will the gateway enable you to leverage a messaging backbone to connect all of your dispersed LANs? Will the gateway support encapsulation to preserve rich data integrity? How tightly will the gateway be integrated with the e-mail system for directory synchronization and adminis-



tration? How easily can users address messages to recipients on foreign e-mail systems?

Quality of connectivity is the critical factor. Simply sending interpersonal messages through a maze of gateways is only a minimum requirement. Too often, gateways can limit the overall functionality of the e-mail system, when in practice they

should be expanding it. E-mail has evolved into a complex system of post offices, MTAs and gateways that must all cooperate as one entity. And relying on multiple electronic mail vendors just adds to the complexity. Which is why the selection

of a vendor supplying connectivity technology is as important as the technology itself.

A single-source vendor can provide technical support and accountability for your entire LAN-based e-mail system. And products which are designed and developed together will deliver higher quality connectivity.

Another point to keep in mind is that a single-source vendor is much

more likely to make timely technological enhancements to gateways that parallel improvements made in their e-mail system. For example, if your e-mail system evolves to allow users to embed charts in their messages, your gateways should evolve so that messages can be sent without losing formatting or data.

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Microsoft

Works for Windows: A solid solution

Technology Analysis — A roundup of expert opinions about new products. Summaries written by freelance writer Emily Leinfuss.

Why buy an integrated applications package for Windows when Windows offers an integrated application environment? The answer may be found in Microsoft Corp.'s Works for Windows, which for \$199 offers capabilities similar to its stand-alone brethren in a much easier to use, less disk-consuming package.

Ease of use: Works for Windows is simple to operate. One attractive feature is easy-to-remember control key shortcuts for nonmouse users. **Integration:** The program has good integration within its applications. But it cannot directly share data with other software programs.

Communications: The communications features are less than top-notch. PC World reported, citing no dialing directory, limited terminal support and one transfer protocol.

Desktop functions: The package has powerful desktop tools. The word processing is good. The spreadsheet and database are a bit weak when compared with full-fledged programs.

Value: Reviewers recommend the package as an easy-to-learn, effective upgrade from Works for DOS. The upgrade price is \$79.

Microsoft Works for Windows

Reviews	Ease of use	Integration	Communications	Desktop functions	Value	Overall
Software 10/1/91	Very good	Fair	NA	Unimpressive word processing	Good	6.5P
PC Computing 10/1/91	Very good	Works well with Windows	Works with Windows communication	Very drawing tools	Worth upgrading to	Irresistible
PC World 6/91	Excellent	Good	Fair	Very good	Excellent	Best buy
Users						
Mark Bryant, Business Management Council	■	■	■	■	■	Covers all the bases
Bruce Bryant, Tegatron	■	■	■	■	■	Good
Mark Figue, Lockhouse Co.	■	■	■	■	■	All-in-one
Analysts						
Jerry Carson, Faulstich Technical Reports	■	■	■	■	■	Limited feature set
John Dunble, Workgroup Technologies, Inc.	■	■	■	■	■	Good
Steve Ellis, D.L. Miller & Associates	■	■	■	■	■	Very strong, highly priced

Key: ■ Very good ■ Good ■ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NA: No comment. Improved rating based on a 1 to 10 scale.

Vendor financial ratings

Analysis	Long-term stability	Short-term performance
John C. Brunell, Sunshine Financial Group	■	■
W. Christopher Mortenson, Allen, Brown & Sons, Inc.	■	■

Microsoft reported revenue of \$581.5 million for the first quarter of 1992, ending last September. Net income was \$144 million, up 64%.

Microsoft responds

Libby Dusan, product manager:

Integration: Filters or conversion utilities allow Works to share data with MS Word for Windows, WordPerfect and Microsoft Write. The database reads and writes dBase files, and the spreadsheet reads and writes Lotus 1-2-3 up to Version 2.2.

Communications: We felt another tool would be redundant with what exists with Windows.

Spinnaker PFS:WindowWorks: A good value

Spinnaker Software PFS: WindowWorks

Reviews	Ease of use	Integration	Communications	Desktop functions	Value	Overall
PC World 5/91	Initiative	Not like one integration	More than most	Word processor strongest features	Worth it for the price	Some base and money
InfoWorld 7/1/91	Very good	Early well-integrated	Good	Very good	Very good	6.5P
Midwest Office 1/91	NC	Dynamic data access available	Drawn's support DDL	Slow	A lot for the price	Functional
Computer Shopper 10/91	Easy to learn	Rather tightly linked	Modest log-on script language	First rate word processor	Great bargain	Enough power
Users						
Spidey Binkley, Independent consultant	■	■	■	■	■	Good package
William Tracy, William Tracy Associates	■	■	■	■	■	Basic product
Steve Ellis, Security Pacific Information Services	■	■	■	■	■	Good integration
Analysts						
Jerry Carson, Faulstich Technical Reports	■	■	■	■	■	Lots of features
John Dunble, Workgroup Technologies, Inc.	■	■	■	■	■	Design is very good

Key: ■ Very good ■ Good ■ Fair ■ Poor

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NA: No comment. Improved rating based on a 1 to 10 scale.

Vendor background information

Spinnaker Software reported revenue of \$15.9 million and a loss of \$750,000 for fiscal 1991 ending in June. Financial analyst John C. Maxwell at Soundview Financial Group rated Spinnaker Software's long-term stability as very good and short-term performance as good.

Spinnaker responds

Henk Howie, product manager:

Desktop functions: We did extensive research as to what our user base said we needed in our products, and in all cases, the emphasis was on word processing over the other applications. As a result, some of the other applications in this product are not as rich in features compared with stand-alone software.

The first vendor to the market with an integrated applications package for Windows, Spinnaker Software Corp. provides a highly integrated set of functions aimed at high-quality document creation in PFS:WindowWorks, according to reviewers.

Ease of use: PFS:WindowWorks is very easy to use and learn. It performs fairly fast, with no undue lags in switching among windows or manipulating data.

Integration: The seven applications of PFS:WindowWorks are well-integrated, if a bit skewed toward getting information into the word processor. Users can have any number of applications open at once and can set up hot key links between them.

Communications: The package provides basic capabilities, with some extras, including several variations for X/Modem, Y/Modem and ASCII.

Desktop functions: The word processor, with its adjunct desktop publishing and scalable font programs, is the real gem here. But the spreadsheet is limited to basic operations, and the database is weak.

Value: The package has more than enough power and was deemed a good value for small businesses and home users, according to InfoWorld. It costs \$199, the same as Microsoft Works for Windows. Also, the company has very good support policies.

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Battery Life	up to 10 hrs	up to 10 hrs	up to 10 hrs
Max Storage	1.2 - 1.44 MB 3.5"	1.2 - 1.44 MB 3.5"	1.2 - 1.44 MB 3.5"
Keyboard/Display	104/104	104/104	104/104
Ports	Serial Ports Parallel Port Mouse Port	Serial Ports Parallel Port Mouse Port	Serial Ports Parallel Port Mouse Port
Software	MS-DOS 5.0 Pro-Manager MasterPort 1.2 Mbytes	MS-DOS 5.0 Pro-Manager MasterPort 1.2 Mbytes	MS-DOS 5.0 Pro-Manager MasterPort 1.2 Mbytes
Security	Standard	Standard	Standard



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COMMENTARY

Jesse Berst

E-mail makes big strides

One of the goals of this two-column is to give you advance warning of GUI trends. In this installment, I want to put the spotlight on an often-overlooked technology: E-mail.

E-mail is much more than a convenience. It is maturing into a core technology that will become central to GUI computing in the 1990s. Four recent developments promise to make E-mail even more important and more accessible: Mail-enabled products, message filtering, programming standards and powerful E-mail engines.

With mail-enabled Windows applications, it's as easy to mail a document as it is to save it or print it. You can send a message, pass along your work to someone else and manage your mailbox—all from a menu choice within the application.

Mail-enabling makes users more productive by letting them stay at home in their favorite application. "It's changed the way I interact with people, especially my boss," says an analyst at a financial firm in the Northeast. "Because it's so simple to send the document I'm working on, it's easier to keep everyone informed what I'm up to."

Several vendors have come out with mail-enabled Windows applications, notably Lotus with 1-2-3 for Windows, Ami Pro and Freelance Graphics for Windows. Microsoft has promised that all of its productivity applications will soon have built-in ties to E-mail.

Look for this feature to be standard on all mainstream products within a year or so.

Increased IQ

E-mail is also getting a boost from technologies that make it "smarter." New techniques for filtering and routing E-mail automate simple procedures. For instance, a filter can sort messages into groups by sender, subject or time of delivery.

Meanwhile, intelligent routing capabilities can automate the flow of documents. For instance, you can set up rules that automatically send any purchase order less than \$1,000 to the supervisor for approval.

You'll soon be seeing some of these filtering and routing capabilities built into E-mail systems from companies such as Microsoft, Lotus and Beyond.

What about the applications you build in-house? That's where standard APIs come into play. Emerging standards will make it much easier for you to create applications that send messages. The idea is to let developers write to one API. They can create an application that sends messages without worrying about which E-mail "engine" will be hooked up to the back end.

For instance, Microsoft has announced a specification called MAPI for any Windows application. In addition, a coalition of other vendors plans for a competing specification. Anti-Microsoft animosity has led Lotus, Apple, Borland and Novell to jointly develop and support an E-mail specification called VIM.

The key difference with VIM is that it sets out to be a cross-platform solution—good news for those who have to support multiple platforms. For its part, Microsoft tells me it will try to merge MAPI with VIM or support VIM in some other way.

Politics aside, it has just become simpler and safer to support E-mail in your in-house applications. As these APIs become available, you won't have to worry about the writer of different E-mail systems and protocols.

Coming attractions

Here's another bit of news.

You'll soon be able to tie into a new generation of powerful E-mail engines. Lotus, for instance, is working hard to merge its CC-Mail with the Notes groupware package. The new product will have the strengths of both.

Microsoft is also at work on a vastly improved E-mail program. I recently saw a sneak preview of Microsoft Mail 3.0. Although I was impressed by the updated interface and ease-of-use features, the biggest improvements are under the hood. Microsoft has spent a lot of effort to turbocharge its E-mail engine.

The new version does a much better job of propagating directories across systems, keeping address lists up to date, supporting multiple transports and providing seamless gateways to other systems.

Taken together, mail-enabled applications, message filtering, standard APIs, better engines—recent developments on the Windows platform point to a much more important role for E-mail. Today, it's often seen as a convenience. Tomorrow, it will be the underlying mechanism for a new generation of groupware applications.

Berst is the publisher of Redmond, Wash.-based "Windows Watch," a newsletter, a monthly briefing service for software executives and corporate technology managers.

Insurer craves pen technology for its next-generation portable

BY MICHAEL FITZGERALD

NEPTUNE, N.J. — Portable computers get a lot of hype, but sometimes the reality is they will fall short of user needs. This is the case at Continental Insurance Co., which in 1992 will perhaps double its number of notebook computers but is already looking for alternative technologies.

A notebook "is not a convenient device," said Joseph W. King, assistant vice president at Continental's data center. "You can't hold it in one hand and keyboard with the other. If you're in a stationary position, you can open and use it, but our users are not stationary very long. So we're finding they leave them in the hotel room and come back and do their work at the end of the day."

Continental assigns notebook computers to its 2,000 claims adjusters, engineers and premium auditors on the basis of their projects' nature and the amount of time they spend in an office. At this time, about 1,000 have been given notebooks, which in many cases serve as their primary machine.

Continental started using portables three years ago, with early, dual-floppy machines from a variety of vendors. King said

these low-end machines were used primarily for word processing and communicating with the home office.

Today, Continental buys mostly Toshiba T2000SX and T2200SX notebook computers, based on Intel Corp.'s 80386SX chips.

In early 1991, Continental began implementing some homegrown application software for the premium monitors and the engineers. The users connect to Application Systems/400s or IBM mainframe hosts to upload information.

King said Continental is pleased with the improvement of data.

Despite the use of notebook computers, King is looking to improve data transfer through pen-based computing.

King said he is interested in pen-based computers because of their potential, rather than any significant dissatisfaction with the notebook computers.

"I think pen-based technology will enable us to do the next shift — we used to have to come back to the office, now we can come back to the hotel room, and I think in the future we can move it to real time," King said.

Continental Insurance Co., Neptune, N.J.

- **Challenges:** Move computing power out into the field with 2,000 claims adjusters, engineers and premium auditors.
- **Current approach:** Notebook computers are used primarily for word processing and communications.
- **Future goals:** To implement pen-based systems that will encourage employees to use their portables more often by letting them work in real time.

The intent of Continental's use of portables is to "improve productivity and accuracy of information by moving the entry of data closer to the event of getting the data," King said.

Blue Cross not singing blues

CONTINUED FROM PAGE 37

things to make one transaction happen," said Samantha Magnuson, manager of the insurer's CASE development center.

"Whereas if the CASE developer has total control on the desktop, they can do it in much less time." Success with CASE for new development was a start, but some 60% of the work at Blue Cross comes in the form of maintaining older systems, something the CASE tools could not help with. As a result, Micro Focus, Inc.'s Cobol was brought in to run a trial run. Persuading the company to go along with the idea of PC-based maintenance became the job of volunteers.

"Basically, we let them use it in their daily work environment for four months, and we monitored the results," said Dan Clark, director of the development center at the firm. "The results of that pilot and the endorsement of the people who were on it was what in effect sold the implementation."

A 15% productivity improvement coupled with 50% less

mainframe use by the test group were just added selling points. The success of the pilot was followed by the introduction of 75 Micro Focus workstations — 80386-based IBM Personal System/2s — during the course of five months, a task Magnuson said he would not recommend to anyone because finding time to help people throughout their learning curves was difficult.

Focusing on training

To help the cause, an in-house training program was started. Programmers were trained in everything from basic PC skills to OS/2 and CompuServe Corp.'s FileAid/PC.

"The maintenance man is hard to crack," said Dan Black, senior consultant at the development center. "Tools fit well in development. They're easy. But bring it in and throw it in maintenance; you're dealing with something totally different there." He said programmers trying to stem the maintenance flow have a more difficult time learning to use new tools, even if the long-term

benefits are appealing. But finding that time was crucial to the effort, Clark said. He said many such projects fail because management wavers.

The results can be gratifying — and profitable. Clark said maintenance programmers often are so impressed with the power of the tools available to them on the PC that they never want to return to the mainframe. In addition, PC-based CASE has freed resources once earmarked for maintenance to be used for new development. "We might have 60% to 70% of our people maintaining, modifying, enhancing existing traditionally developed systems. We've only got about 10% to 15% of our CASE resources dedicated to maintaining, enhancing CASE developed systems," Clark said.

Patience is key. Indeed, costs may have actually increased for a short time as programmers became used to their new tools. And measurable positive results took nearly a year to materialize. But the desired effect — systems capable of rolling with the blows in what may be some tumultuous times for health insurers — make the trials worth the effort, at least for Blue Cross.

WORKGROUP COMPUTING

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IN BRIEF DG claims Avilion tops

■ The game of king of the hill continues in the benchmark arena. Data General Corp. in Westborough, Mass., claims that tests of its Avilion AV 5225 showed better price/performance results than any other reduced-instruction set computing system under the TPC-A benchmark. DG tested a client/server configuration that included an AV 5225 running DG/UX 5.4.1, Informix Corp.'s Online 4.1 software, an AV 4320 running Unix Systems Laboratories, Inc.'s Tuxedo Transaction Manager and 510 DG terminals. DG said the system produced a throughput of 50.69 trans./sec. for a price/performance level of \$11,496 per transaction.

■ Proxim, Inc. in Mountain View, Calif., recently introduced what it said is the first family of wireless local-area network adapters for both desktop and portable personal computers. The RangeLAN cards use spread-spectrum radio frequency, cost \$495 per desktop unit and are scheduled to ship in March.

■ Users who want to move their tried-and-true DOS applications to IBM's RISC System/6000 Unix-based workstations will soon be able to do so. In March, Incentive Systems in Palo Alto, Calif., will begin porting DOS applications to AIX, IBM's version of Unix.

■ DG said its Avilion systems running its DG/UX 5.4.1 Unix-like operating system have received seals of approval from two standards bodies. The National Institute of Standards and Technology certified the DG systems and the X/Open Consortium Ltd. said the computers also comply with the X/Open Portability Guide 3 standards.

Imaging heals hospital's sick file system

BY JIM NASH
ON STAFF

SAN JOSE, Calif. — It will never have the same slick drama of a nurse snapping scalpels into a surgeon's gloved hand, but finding and delivering patients' files quickly can be every bit as important to proper medical care as operating room tools.

Take, for example, San Jose Medical Center, a 315-bed community trauma facility. Though the center has been aggressive in implementing innovative care and rehabilitation programs for

ments could be almost anywhere in the hospital, she said.

Secondary to the physical danger of delays for patients in the financial cost. "The labor involved in handling paper is massive. My cost for retrieving a medical record is about \$13," Little said. Today, she is working to simultaneously eliminate file bottlenecks, curb hospital staff and even bring in new revenue through use of an image management system. Her office adjoins a room dominated by tall shelves holding color- and number-coded patient files. Little

would like to see that storage system, which is augmented by an IBM 3090 mainframe, become an asynchronous.

The mainframe holds a patient's information for a week after he is released, a role the machine will keep as networking progresses. But now, records are being transferred to a Banyan Systems, Inc. Vines personal computer network for long-term storage. Roughly 40% of each patient's total

ON SITE San Jose Medical Center San Jose, Calif.

- **Challenge:** Speed access to medical records and make record management more efficient.
- **Technology:** Document management software, a relational database and imaging equipment on a LAN.
- **Results:** Staff has been reduced and the hospital may be able to collect \$150,000 in new revenue by handling external record requests itself.

file is computer-generated and stored. Little said she wants that percentage to hit 95% in four years. "I think I can be categorized as a demanding user," said Little, who has a master's degree in information systems management. "I don't want to hear,

patients, until six months get to pass 60 minutes to get paper files to the emergency room.

"Sometimes that meant dropping everything and actually looking for certain files," said Bonnie Little, the affable director of medical records at San Jose Medical. Needed docu-



San Jose Medical Center's Little works to eliminate file bottlenecks and bring in revenue with an image management system.

"The system won't allow me to do this or that."

Six months ago, the hospital began storing documents electronically using Quixis Software, Inc.'s Fountainhead software, which pulls together scattered patient documents into a massive, secure and audited database. San Jose-based Quixis combines Wang Laboratories, Inc.'s Open/Image-Window front-end software and a Gupta Technologies, Inc. relational database within Fountainhead.

Little has had nothing but accolades for the system, which re-

sides on 21 Wang and IBM-compatible 80386 workstations on a Vines Version 4.1 network. The system cost about \$450,000 and should offer the center savings of \$380,000 in the first year, she said. Payback is expected early in the second year.

A third of the way through an 18-month implementation, Little said she has been able to cut her staff from the equivalent of 34.5 employees to 29. She has committed to trimming 20% when the project is completed.

"I'm confident I can cut staff

Continued on page 44

Superserver makers move to catch next wave

BY MICHAEL FITZGERALD
ON STAFF

The superserver market will boom in 1992, to hear Enzo Torresi, president of NetFrame Systems, Inc., tell it. Torresi said his company will hit the \$40 million mark in sales this year as a result of that boom, although that would make it a big player in a small market.

Still, increased activity in the long-bygone superserver market represents a step forward from where the market has been. Recently, the market had a near-waterproof wet when NetFrame introduced two new servers and an application processor concept [CW, Feb. 24],

while competitor Parolan Computer, Inc. announced it had sold two of its Parallax Server 290s to Chevron Canada Ltd. Chevron will use the Parallax for a new sales application.

Torresi said that his company was shifting from its original focus of providing users with an opportunity to consolidate numerous personal computer file servers into a NetFrame, to becoming a producer of application servers.

"Enabling software is now becoming available from Oracle, Sybase, Informix and others. But it's slow, serious, industrial-strength database software that can run these superservers," Torresi said.

NetFrame's forthcoming application processor cards will work as a form of multiprocessing: The base system will run Novell, Inc.'s NetWare, or strands of OS/2 or Unix when NetFrame makes those available for its servers later in the year. The application processor will run the application.

The vendor activity may be coming now too soon, as superserver vendors are running into increased competition from traditional PC vendors moving in on performance and offering features previously limited to the superserver market.

For instance, Louis Kahn, network administrator for the Division of Immunization at the Centers for Disease Control in Atlanta, said that "the one thing NetFrame had over anybody else was SAM [server activated maintenance, a tool that lets users manage their network remotely]. Now, [Compaq's] Sys-

tempro has its System Manager board, and it's not as good, but eventually my Systemsware will do remote management as well as NetFrame does."

At the same time as they face increased competition, NetFrame, Parolan and other superserver makers will have to continue their efforts to educate users on their machines.

Doug Crook, an analyst at Dataquest, Inc., said the superserver market still has a long way to go before it becomes generally accepted and will raise issues within corporations that they have not faced before with traditional PC technology.

"The technology is ahead of the infrastructure the industry has to support it," Crook said. "These are sophisticated boxes that come out of the PC environment, and the way they're being positioned in end-user sites crosses a lot of organizational boundaries."

Retailers demanding X/Open branding

This computer industry seal of approval has vendors' attention — without it, they face rejection

BY MARTYRAN JOHNSON
OF ENR

When computer vendors came calling on The Burlington Co. or J.C. Penney Co. or Wal-Mart Stores, Inc., they do not get a foot in the door without Brand X.

More precisely, it is X/Open branding, or compliance with standards from X/Open Co. Ltd., that these retailers are demanding, in what has evolved into the computer industry's version of the Good Housekeeping Seal of Approval.

X/Open branding means the product has passed a substantial suite of verification tests that certify it meets the application portability guidelines established by X/Open. More than 300 products on the market today comply with Version 3 of the X/Open Portability Guide (XPG3), which incorporates standards such as the X Window System.

Happy medium

"If you're going to be a multi-vendor open shop, having some common denominator of the interfaces provided is important," said Michael Prince, MIS director at The Burlington Co. Factory in Lebanon, N.H.

"We feel the X/Open definitions, or branding, provide a

good way to get there," Prince noted.

Each of Burlington's 170 stores across the country is equipped with a Sun Microsystems, Inc. workstation, a local-area network and NCR Corp. cash registers with "personal computer engines," Prince said. The Sun acts as file servers and communication gateways to a data center anchored by five Sequent Computer Systems, Inc. Series 2000 Unix superminis.

"It's really important to us to be able to go out and buy equipment in an open environment that integrates easily with our network," Prince said. From an initial base of support mainly among government, agencies and telephone companies, X/Open's impact is spreading into the corporate sector, with the retail industry out in front.

"Retailers use such a wide variety of equipment," said Mark Schmidt, vice president of information technology and communications at Wal-Mart in Bentonville, Ark. "It's one thing to run a data center and have one or two facilities, where you can rely on a single vendor to supply most of

ten by Wal-Mart programmers use the XPG3 standards to ensure portability among Unix platforms from Hewlett-Packard Co., NCR and IBM. "We have applications where identical source code runs on both NCR and HP Unix systems," Schmidt noted.

The X/Open standards have become "the highest level of open systems standards you can get," said Jim Johnson, chairman of The Standish Group International, Inc., a market research and consulting firm in Hymms, Mass. "But there's still not a lot of people who go out to buy a computer system and say, 'It must be X/Open-branded.' That's coming, however, and retailers like Wal-Mart and Burlington have been leading the pack."

Businesses with multiple locations, varying sizes of computers and the need for common control over those systems are finding X/Open standards increasingly appealing, said Bob

Levin, vice president of North American operations at X/Open in Menlo Park, Calif. "We're also seeing a lot of interest from companies in the petrochemical area," Levin said.

The oil companies have established their own standards body in the Petrochemical Open Software Corp., which included the XPG3 standards in its goal of establishing a common applications programming environment for the oil and gas exploration industry.

Functional agenda

X/Open will be fine-tuning the XPG standards in the upcoming release of XPG4 in mid-1992, Levin said.

The plan is to develop "functional profiles" that outline which standards are necessary for what type of computing platform — such as database servers or professional workstations. "We're looking at what functions these pieces of equipment will perform and what standards will be most beneficial to users," Levin explained.

Commercial users are eager to see that come about, Schmidt said. "It's very important that X/Open get into the definition of distributed transaction processing standards," he noted. "I know they're working on it, and we're waiting."



Burlington's Prince: X/Open standards provide a common denominator for multi-vendor interfaces

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HP design strategy features top 'cook'

BY MARTYRAN JOHNSON
OF ENR

Hewlett-Packard Co. last week unveiled the next generation of its mechanical design software — HP Precision Engineering Systems — and based the new products on a quickly evolving industry standard geometric engine called ACIS.

Named after the three scientists who created the technology for Spatial Technology, Inc. in Boulder, Colo., ACIS is a vendor-neutral, three-dimensional geometric modeler. Applications based on the object-oriented ACIS kernel speed up product development by enhancing software interoperability among different geometric modeling packages.

HP's Precision Engineering Systems is a product-modeling environment that will eventually include a suite of integrated software applications for 3-D solid design, data and process management as well as 2-D design and drafting.

The first two products, HP Solid Designer and HP Work Manager, will run on HP Apollo

workstations initially and on Sun Microsystems, Inc. workstations next year.

Reducing time-to-market for manufacturers in automotive, aerospace or shipbuilding industries should be the biggest benefit for users of the software, said analyst Kate Fessenden at Meta Group, Inc. in Westport, Conn. "Once users are able to to-

THE HP WORK MANAGER software ensures security, accuracy and accessibility of all the data.

gether these design processes without redefining all the geometry involved, that will cut down time-to-market significantly," she said.

Other major vendors of computer-aided design and manufacturing technology — such as the Unigraphics Division of Electronic Data Systems Corp. or ComputerVision, Inc. — are expected

to introduce ACIS-based products later this year.

HP Solid Designer can be likened to a recipe where ingredients such as assembly instructions or material specifications are mixed in the design model. The "cook" is the HP Work Manager software, which ensures security, accuracy and accessibility of all the data.

Grand designs

"Our software allows entire engineering teams to see the history, decisions and future development plans that guide the product," said Tilmann Schud, general manager at HP's Mechanical Design Division. The Precision Engineering software can be ordered next month.

The Solid Designer package is priced from \$7,500; HP Work Manager comes in client/server configurations, with client seats starting at \$1,500 for clients and \$7,000 for servers.

Analysts said the pricing of HP's new offering is quite competitive for a market where applications often range from \$30,000 to \$100,000.

Imaging heals hospital

CONTINUED FROM PAGE 43

in half using the system," according to Little. Most of the 2,000 monthly requests for documents come from San Jose Medical staff. But a significant portion comes from outside parties: attorneys, governmental agencies, insurance companies and other hospitals.

There is the potential to rake in \$150,000 annually by providing copies of documents to outsiders, Little said. Most hospitals hand documents to a copying service.

"When I studied the situation here," said Quessa President Martin Minopie, "I was struck by the fact that the hospital did 70% of the work, and the copier (service) gets 100% of the profit."

San Jose Medical's parent company, Health Dimensions, Inc. in San Jose, has been so impressed with work to date that it has committed to expand imaging to the human resources department, Little said.

Conflicts resolved

Benefits ripple from IS to the hospital's administration at large. Prior to its installation, documents were often caught in

a crossfire of requests.

"We had invented lots of prioritization schemes to determine who would get documents when. We had lots of unhappy people," Little said. "Now, we don't have to be cops anymore." Documents can be called by multiple users simultaneously.

Until the hospital is fully networked — in about three years — those employees without a PC will continue to call or write document requests to the records department.

About 30% of all patient records have been imaged. As previous patients return to San Jose Medical, their old paper records are imaged. About 500,000 records and historical medical summaries dating back to 1983 are part of the database, and 20,000 documents have been imaged so far.

From a professional point of view, records can now be called up 24 hours a day. Copies can be faxed to the emergency room now in less than two minutes. Plans call for extending the imaging network there this year, to reduce file access time to 10 seconds for that unit.

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COMMENTARY

Jeffrey N. Fritz

An ISDN for the road



About a month ago I was in Washington, D.C., for a conference. You'd think that being in the heart of the nation I would have had access to the finest data communications facilities available anywhere in the country.

Unfortunately, this was far from the case. When it came to accessing my home-based data services, I was at a complete disadvantage. All I had at my disposal was a 2,400 bit/sec. modem and an analog telephone line. This is not nearly enough to meet the connectivity needs I have while I'm on the road. What I really need is national ISDN.

National ISDN would provide all the connectivity I need to do my work away from home. I could simply connect a router to the data port of my host's ISDN phone and place a circuit-switched call at 64K bit/sec. to a secured router on my office LAN. Through ISDN all my LAN services would be available, even if I were 2,500 miles from home. This kind of distance connectivity isn't as farfetched as it sounds.

National ISDN discussions are not confined to just this one conference. There has been increasing talk both in the trade media and at recent ISDN conferences about the importance of national ISDN. It is easy to understand why. Other means of transport are either too slow or too expensive. Analog modems simply cannot provide trans-

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Bellcore releases SMDS rules

Network management plans pave way for switched high-speed service

BY JOANIE M. WEXLER
OF STAFF

Bellcore recently released Round 2 of its network management specifications for Switched Multimegabit Data Service (SMDS), a cell-based public network offering slated to emerge late this year from the Bell operating companies (BOCs).

Analysts agree that the reconfiguration capabilities and "Secure" Simple Network Management Protocol (SNMP) inherent in the guidelines do not necessarily give SMDS a management edge over rival technology frame relay.

The "connectionless" public-

switched nature of SMDS requires more management to be built into the technology, said Mark LaRow, a senior manager at Ernst & Young in Fairfax, Va. This is because SMDS as a public-only service uses the central office switch to route each packet to its intended end-node address, so it must understand upper-layer protocol addressing schemes.

Also, the packet-by-packet routing scheme requires a degree of security to be built into the network. Frame relay, on the other hand, is a connection-oriented service in which virtual circuits are pre-established between destinations. "So any

packet I send will never appear at your premise, even if both of us subscribe to the same service," LaRow said.

Frame relay is already available in private networks and from several interexchange carriers. It is also slated for delivery from the BOCs this year. Bellcore, the research and development arm of the BOCs, has not yet created management standards for frame relay.

The recently released SMDS specifications add customer reconfiguration capabilities to allow users to add and delete addresses from group addresses and screening lists without issuing a service order, said Dave Pici-

tello, a member of Bellcore's technical staff.

Bellcore said it has implemented Secure SNMP in SMDS equipment specifications to mirror the SNMP-oriented management nature of local-area networks. The BOCs are positioning SMDS primarily as a LAN interconnection service.

Secure SNMP is a recently approved SNMP version that provides user authentication and privacy for messages between an SNMP management system and the managed agent via encryption. This move came in response to criticism that the widely used SNMP lacked security features.

The SNMP component "is attractive for any public LAN inter-network offering to a customer who can get visibility into what's happening to network packets,"

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Interest gained on bank's VTAM package

BY ELISABETH BROWITT
OF STAFF

BURLINGTON, Vt. — Bank of Vermont expects its IBM System Network Architecture (SNA) network to disappear during the next few years, as its host services move over to private company First National Bank of Boston. Nevertheless, response-time problems have been serious enough at the company to justify implementing a VTAM network-monitoring package to keep the network in trim for the remainder of its lifetime.

"A couple of years ago, the way we measured response time on our network was by sending someone out to the branches with a stopwatch," said Rick Ketcham, a senior technology specialist at Bank of Vermont. The stopwatch check revealed that response time was spiking at 30 seconds for some transac-

tions. The bank's target figure for network response time is four seconds. "Things were pretty bad," Ketcham said.

However, the bank had diffi-

culty pinpointing the source of the response-time degradation because of the complexity of its network. During the past few years, the bank's network has grown from "a simple SNA network" to a configuration that links branch systems to multiple IBM hosts in Vermont and Boston.

Bank of Vermont's 12 branches continue to access the bank's own IBM 4381 host for some applications but increasingly must use a dedicated T1 link to access the Bank of Boston's host. "The target date is sometime in 1994 to have everything migrated off our system here" to Bank of Boston hosts, Ketcham said.

Bank of Vermont

will retain a bare-bones information systems facility with a personal computer local-area network to support local printer services and end-user and branch applications, Ketcham added.

Meanwhile, Ketcham's group is responsible for addressing response-time problems for Bank of Vermont's own branches, whether or not an application resides in Burlington or Boston.

Naturally, the Boston and Vermont IS groups must share responsibility when a problem develops across their respective systems. For example, when Vermont users have response-time problems accessing a Boston host and the SNA network seems to be working fine, Boston's data center gets a call from the Bank of Vermont's IS department.

A Boston host, reactivated at

Continued on page 48



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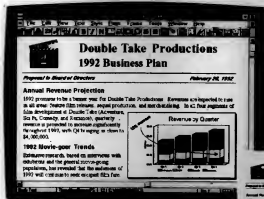
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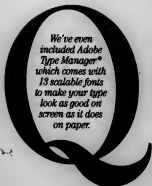
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IN BRIEF

Global net set for UPS

■ **United Parcel Service, Inc.** has completed installation of UPNet, its new global telecommunications network, which links 1,200 of the package handler's sites in 80 countries, UPS said. UPNet supports International Shipments Processing System, which provides international shipping information directly to customs bureaus for quicker clearance on arrival. The network combines X.25-compatible packet-switching and T1 multiplexers that can support speeds of up to 45M bps/sec. The new network ended up costing \$14 million, UPS said.

■ **The International Telecommunications Union** is now holding the World Administrative Radio Conference 1992 in Malaga-Torremolinos, Spain, to discuss issues relating to allocation of radio frequencies (RF) among various national and international wireless services. The conference runs through tomorrow. A key item on the agenda is scarcity of available RF bandwidth, coupled with rapid proliferation of wireless services.

■ **The Australian National Line (ANL)**, a major Australia-based shipping company, has chosen General Electric Information Services (GEIS) for a recently installed communications system that will track each of its containers' movements worldwide. The ANL system uses GEIS' EDI/Express electronic data interchange service control to model and simulate the position of the company's container stock at a future time and forecast container requirements so equipment can be directed where it is needed. In addition, ANL's worldwide network of agents uses GEIS' Quick-Comm electronic mail service to exchange messages. ANL said it expects to save \$3 million (Australian) per year from the system, by figuring out least-cost solutions to expected shortages.

Tangram promises control over distributed PC software

BY ELISABETH HORWITT
OF STAFF

RALEIGH, N.C. — Tangram Systems Corp. has expanded its IBM mainframe-based software distribution products to address the broader needs of information systems managers who want to control their distributed personal computer environments from the mainframe.

Tangram announced the AM-PM Asset Management System, an IBM mainframe-based program for keeping track of both hardware and software resources on remote PCs. The company also announced that AM-PM, its IBM host-based software distribution and data collection package, will support Novell, Inc.'s NetWare for Systems Application Architecture (SAA).

The PC-Audit component of Tangram's Asset Management System is said to automatically compile an inventory of software and hardware resources residing on distributed PCs.

The Software Asset Inventory program is said to find out

what versions of what software packages and what files reside at a particular PC. The Hardware Asset Inventory program reportedly scans each workstation for information on CPU type, number of disk drives and amount of memory.

A Comprehensive Hardware Inventory program can be used to query users about configuration information that the PC cannot provide automatically, such as brand name and serial number, Tangram said.

Time-saving measure
Society Bank, a current AM-PM user, is interested in the Asset Management System as a way of keeping track of both PC hardware and software, according to Cal Tabernik, a quality adviser at the bank.

"It's time-consuming now to find out what versions of software people are using, and they don't always know," he said.

The bank needs to know whether a user has the right hardware to support the latest version of, say, Windows or the right PC software version to sup-

port a new upgrade, Tabernik said. "Obviously, this would be easier with a central repository" of such data, he said.

Another component of the system, Asset Tracker, is said to monitor program use on workstations. This enables IS administrators to measure the acceptance level of a recently introduced package or reallocate a package that is being underused to someone who really needs it, according to Tangram spokesman Steve Karkus.

Programs such as Tangram's, which audit distributed PC installations, are fast becoming "all the rage" among companies that are struggling to cope with burgeoning local-area network installations, said Ben Ruit, a senior director at LAN integrator LANSystems, Inc. in New York.

Besides ensuring that users all have consistent, updated versions of a particular software package, such programs can also help IS departments guard against the use of unlicensed copies, Ruit said. One major corporation's IS department has been tracking PC software use

by going from PC to PC with a floppy disk, he added.

The AM-PM Asset Management System for DOS and Windows is scheduled for availability next month, with an OS/2 version due out in the second quarter of this year. Information collected by the system can be ported to a mainframe DB2 database for analysis and reporting. The product is priced at \$34,500 and requires AM-PM, which is priced at \$49,500. Current AM-PM customers can purchase the Asset Management System for \$29,500.

Tangram also announced AM-PM Support for Novell's NetWare for SAA. NetWare for SAA is said to link NetWare 3.03-based servers to a variety of IBM hosts using popular IBM protocols such as LU6.2 and 3270.

A NetWare Loadable Module enables AM-PM to make use of NetWare for SAA's connections from the same server, Tangram said. Support for NetWare is available with AM-PM at no extra charge.

Also announced by Tangram was Enhanced Administrator Services Interface, which is said to give a network administrator access to the host-based system via an OS/2 Presentation Manager-based graphical user interface. The product is priced at \$2,500.

Interest gained on bank's VTAM package

CONTINUED FROM PAGE 45

the start of the business week, "has been known to go in and grab all the physical and logical units on the entire line," leaving Bank of Vermont users without connections to their host applications, Ketcham said. Bank of Boston has addressed this problem by using IBM's NetView to standardize and automate mainframe start-ups as much as possible, he added.

Bank of Vermont's data center implemented Btrieve Software's Vital Signs for VTAM to "monitor response time and errors on our piece of network," reaching from the IBM front end all the way to the terminals.

One type of response-time trouble that Vital Signs has identified for the bank is too many transactions lining up in the front-end processor's Network Control Program (NCP) queue. "We can address this by increasing the bandwidth for specific lines, adding more NCP buffers or changing the parameters that manage SNA resources," Ketcham said.

Another common sign of trouble is a PC transmitting an unusual amount of data, given the size of the files it is sending.

This often points to a modem or telephone line problem that is forcing the PC to keep retransmitting the same data, Ketcham said.

Lesson learned

One of the most valuable things the bank learned from Vital Signs was that its existing 56K bit/sec. link between the two data centers was no longer adequate. File transfers between the Boston data center and Vermont bank branches had grown steadily, as more banking applications moved to Boston.

Vital Signs found that a line averaging 20% usage could shoot up to an average of 98% in matter of seconds, "actually handling some terminal traffic off-line," Ketcham said. The solution, implemented three weeks ago, was increasing the pipe to 128K bit/sec.

"That took us to be sufficient for a while, but we may have to boost it even more," Ketcham said.

Bank of Vermont got a special deal on its Vital Signs for VTAM license. The regular price for the package, for an IBM 4381 running VM, is \$20,000.

Bellcore releases SMDS specifications

CONTINUED FROM PAGE 45

Jennifer Figg, data communications program manager at The Yankee Group in Boston.

Steven A. Taylor, president of Distributed Networking Associates, a consultancy in Greensboro, N.C., asserted that "many of the aspects of SMDS network management could be fairly readily adapted to the frame-relay world. SNMP works equally well over both."

Making the switch

One requirement for using SMDS to manage a frame-relay network, however, is that the user's or carrier's equipment is inherently SNMP-manageable. Stratuscom, Inc.'s IPX fast-packet switch — widely used in fast-packet networks and by most of the carriers with announced public frame-relay services — is currently not SNMP-compliant.

Fast-packet switching equipment from such vendors as Templex, Inc., Codes Corp. and Newbridge Networks, Inc. is



NETWORK MANAGEMENT

SNMP-manageable, however.

Approximately 30 to 40 users of frame-relay technology are now "employing best-guess capacity planning," said Phil Evans, senior adviser to the International

Communications Association, a 2,000-member telecommunications user group that is based in Dallas.

Merely interesting

Evans said that while SNMP would give users a historical picture of peak frame-relay traffic loads, "frequently, this would simply be interesting material because the business keeps changing."

Evans, who is an advocate of fast-packet technologies, added that if both frame relay and SMDS satisfied his transport requirements, one point of differentiation could be management services.

"However, I'm not sure yet what that differentiating point would be," he said.

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NEW DEALS

ICL outsources to Ascom

■ **ICL**, a \$4 billion global computer products firm, has outsourced the management of its North American communications network to **Ascom Timples**. ICL has reportedly transferred its network management center in Ulica, N.Y., to Ascom Timples' Customer Assistance Center in Clearwater, Fla. Ascom Timples multiplexers and X.25 packet switches installed in the ICL network along with other vendors' modems and transmission facilities will be managed by Ascom Timples.

■ **Fashion specialty retailer Nordstrom, Inc.** has reportedly purchased **Symbol Technologies, Inc.**'s bar code-based data capture systems for capturing sales information at point-of-sale (POS) sites. Handheld scanners will plug into the retailer's POS registers from another vendor, and Symbol Technologies will also provide its

wireless, radio frequency data communications technology for real-time store applications.

■ **The American Bar Association** has reportedly contracted with **AT&T EasyLink Services** to provide messaging services for the association's national electronic communications and information network.

■ **Global network service provider Infontel** said it has established an electronic data interchange (EDI) service alliance with **Sears Communications Co.** The companies said they aim to serve as a single point of accountability for customers with EDI transactions traversing the two networks. Sears runs a North America-only retail EDI network.

■ **Network integrator consortium The Asset Group** has announced its second million-dollar network integration

contract. The six-company, nationwide group will reportedly manage and maintain a seven-city, 1,200-user **Banyan Systems, Inc.** Vines network for West Coast-based law firm **Bell, Ehrman, White & Mulhullie**. Participating Asist Group companies are **International Microcom Systems, Inc.**, **Integrated Systems Group** and **Trellis**.

■ **Mead Data Central, Inc.** has reportedly signed a multi-year, multimillion-dollar contract with **BBN Communications** for wide-area access equipment to Mead's legal information and news retrieval service. Network management services are also included in the contract.

■ **Oil and engineering construction firm Halliburton Co.** has signed on **Scientific-Atlanta, Inc.** for a \$4 million, X.25 very small-aperture terminal network linking about 200 offices nationwide. The network installation is slated for completion in June.

Fritz

FROM PAGE 45

parent access to network services. T1 or DS-3 services provide the necessary speeds but at costs far above what most universities can afford.

ISDN, with its ability to support LAN protocols such as TCP/IP, provides a good good solution to extended connectivity. The problem is that today's ISDN is at best no more than a metropolitan-area network, and a very restricted one at that.

More often than not, the telephone carriers look at national ISDN data as something that will come "in due time." It is frustrating that, when it comes to data, so many carriers think that the "it" in ISDN stands for "Island." Although there is an ever-growing need for extended ISDN services, the telephone carriers offer very little ISDN data service outside of single-switch islands.

ISDN users, particularly on a university level, need regional and national ISDN interconnectivity.

The California state university system is a case in point. A number of colleges and universities share resources. Distance learning, where an instructor on one campus uses video and data exchange to teach students on another campus, is an important and growing aspect of the California system.

Also, many students live off campus, some as far as 200 miles away. These students need better connectivity for registration and class-related items to reduce unnecessary travel.

On campus, the story is the same. Not all university facilities

have access to campus backbone services. Therefore, campuses need to provide interim connectivity to university services. In some cases, full backbone connectivity is years away.

We have all heard that national ISDN, at least in the U.S., is coming. There are some encouraging signs. The much-reputed National ISDN-1 standards promise national ISDN connectivity sometime this year. Quietly, the local exchange carriers are deploying **Signal** System 7, which is necessary for ISDN connection among central offices. Progress is being made. The question is, how long will the wait be?

There is little question that national ISDN should come too soon. Life for today's data traveler is far too tedious. Even with an analog LAN gateway, it is still difficult to connect from the Bay area to my home services. The reason? My hosts use **Sprint** for their long-distance services; I have an AT&T calling card. That combination requires a long and complex series of numbers to place a call. With voice calls, this is just a nuisance. With a modem call, it's downright impractical.

I suppose I could ask my hosts to pay for the call and then reimburse them, but such tactics usually result in damaged friendships if not handled correctly. I asked Sprint how to place a credit-card modem call. The operator kindly but firmly responded, "I honestly don't know, sir." That is why we need national ISDN connectivity now!

Fritz is a data communications analyst at West Virginia University in Morgantown, W. Va.

NEW PRODUCTS

Network management

Telekec has announced a portable protocol analyzer and simulator for the Channel 1800.

The product provides a graphical user interface (GUI) for testing networks at up to 2.048M bps/sec. It analyzes frame relay, X.25 and Integrated Services Digital Network Primary Rate Interface data over a V.35, T1 or E1 physical connection.

It features a GUI to simplify troubleshooting and maintenance of wide-area networks, the company reported.

■ Introductory cost of \$18,000 is offered until May 31, 1992. **Telekec**

26580 W. Agoura Road
Calabasas, Calif. 91302
(818) 880-5655

Dolphin Networks, a division of **Digital Technology, Inc.**, has begun shipping LAN Command Advanced for Novell, Inc. NetWare local-and-wide-area networks.

The product incorporates artificial intelligence, self-populating databases, client/server diagnostic tools and a number of other advanced network management features. It simultaneously supports NetWare 286 and 386 versions and automatically functions across bridges, routers and gateways for WAN support.

Network analysis is presented in English language statements, LAN Command Advanced is intended as a proactive management tool for preventing downtime, the company said.

Pricing runs from \$895 for 15 nodes up to \$7,995 for 1,000 nodes.

Dolphin Networks
Suite B-108
4405 International Blvd.
Norrwood, Ga. 30093
(404) 279-7050

Customer-premises equipment

Two mobile teleconferencing systems have been announced by **NEC America, Inc.**

The **Remdes-View 5510** is a self-contained unit with a 27-in. color monitor. It includes auto focus, 8-by-6-input video switching and graphics preview. Optional telephone interfaces, network terminal adapters and high scan-rate graphics monitors are available. Pricing ranges from \$23,900 to \$38,900.

The 5520 model has two monitors and includes the same features as the 5510. Pricing ranges from \$28,300 to \$33,300.

NEC America Data and Video Communications Systems Division
110 Rio Robles
San Jose, Calif. 95134
(408) 433-1279

Gateways, bridges, routers

Racal-Datcom, Inc. has announced the Series 345 network processor.

The Series 345 provides transparent access to a variety of communications platforms

and protocols. It supports synchronous and asynchronous communications, X.25, BSM and Ethernet, Transmission Control Protocol/Internet Protocol and local area transport local-area network protocols. All protocols can share the same communications trunk.

The product is targeted at smaller businesses and branch offices requiring high-level connectivity. Pricing begins at \$6,025.

Racal-Datcom
1601 N. Harrison Pkwy.
Sunrise, Fla. 33323
(305) 846-1601



Coefficient's Migrate connects networks to VAX hosts via LAT

Coefficient Systems Corp. has announced **Migrate**. The hardware solution provides a local-area computer network connected between a **Digital Equipment Corp. VAX** host and a local-area network.

Migrate works with host systems running **LAT** and personal computer networks connected via **Token Ring**, **Ethernet**, **Starlan** and other technologies.

LAT traffic on the LAN is transmitted via a routable protocol, providing support for wide-area connections. LAN nodes can terminate-and-stay-render **Migrate** drivers but do not require **LAT** or **DECnet** drivers.

For users with multiple **Token Ring** LANs that are already

physically connected to an Ethernet backbone, a single **Migrate** unit will handle routing across all the **Token Ring** subnets, the company reported.

Pricing ranges from \$2,000 for 5 LAT sessions to \$12,000 for 128 sessions.

Coefficient Systems
2039 Palmair Ave.
Larchmont, N.Y. 10538
(914) 834-0446

Computone Corp. has created an off-the-shelf Unix to System Network Architecture (SNA) **Token Ring** gateway.

Lyrix Token Ring provides Intel Corp. processor-based Unix workstations with high-speed access to SNA resources across a 4M- or 16M bps/sec network. Installed on an Ethernet-equipped workstation, it can also serve as an **Ethernet/Token Ring/SNA** gateway. It supports simultaneous SNA and Transmission Control Protocol/Internet Protocol communications over the **Token Ring** local-area network.

Pricing ranges from \$1,095

for 32 sessions to \$3,495 for 254 sessions.

Computone
Suite 150
1100 Northmeadow Pkwy.
Rowell, Ga. 30076
(404) 475-2725

Micro-to-host

Computer Logics Ltd. has released **Pip Windows 2.1**.

Pip Windows is a terminal emulation program allowing **Microsoft Corp. Windows** users to access **Unisys Corp. Series 1100/2200** and **System/80** mainframes. The new version is smaller and provides faster mainframe access, the company said. It also supports **Dynamic Data Exchange**, macro files, configurable color sessions and up to eight concurrent host sessions.

The product costs \$370. Upgrades from DOS versions are \$89.

Computer Logics
31200 Carter St.
Solon, Ohio 44139
(216) 349-8600

LARGE SYSTEMS

SOFTWARE • APPLICATION DEVELOPMENT

War between EDS and CA sparks debate

Users and lawyers alike need to better understand the laws governing their software contracts

BY NELL MARGOLIS
CW STAFF

The software licensing battle between Electronic Data Systems Corp. and Computer Associates International, Inc. is forcing an issue to the forefront that has been building behind the scenes for months: Who has what rights in software, and why?

Early in the debate, one disturbing reality is emerging: Many users are relatively ignorant—or even unaware—of the fine points of the contracts that both confer and constrain their rights to the software on which their businesses run.

"Users don't understand software licenses, to a great extent," said Dino Gallo, an Audubon, N.J.-based computer lawyer who frequently represents large firms—vendors and users alike—in licensing contract issues. In fact, she said, in her experience representing software vendors, "Most of the [license] contracts I send out come back unred and signed."

To the extent that software li-

cence contracts prove a battleground between users and their software suppliers, this means that users all too frequently come unaided to the fray.

In many cases, Gallo said, the contracts are handled by a general corporate lawyer who has no extensive experience with software—either as a technician or as a tool. Lacking understanding of the context, the lawyers rubber-stamp the contracts—leaving their clients unprotected.

In one recent instance, Gallo said, "The [user's] lawyer came into my office with a book on negotiating software agreements. I was representing the software company, so there was nothing I could do; but I wanted to tell the user, 'Watch it—you're not getting the protection you think you bought.'"

"Users often are wholly unaware that they're not getting well-represented," she said.

Even in cases where license

contracts are carefully negotiated, Gallo added, technologically naive lawyers can unintentionally leave their clients unguarded.

"If the lawyers don't understand the license's technical provisions," she said, "they'll pick away at some less meaningful clause, seem like they're being

very protective—and neglect safeguards that they might have put into the contracts if they had known what they were up against."

Even technologically savvy lawyers will offer less than the best protection if they do not also have a firm grasp of the business realities involved—and on both sides of the contract, noted Robert E. Zahler, a partner at the Washington, D.C.-based law firm of Shaw, Pittman, Petta & Trowbridge.

The user firms he has encountered in his extensive technology industry practice "usually understand their contracts," Zahler said. "But they don't al-

ways focus in on the relevant business aspects of the relationship the contract covers." For instance, he said, issues of software maintenance and of the user's rights to move the software among platforms and geographical locations often receive short shrift.

An increasingly sophisticated user community is beginning to catch on to the fact that software licensing can be potentially tricky terrain—and that they are the ones out there without a map, Gallo said.

Outsourcing offshoots
The outsourcing phenomenon has added another dicey element to an already precarious situation, according to several computer lawyers. "Even a computer lawyer might not know what to do with licenses in the face of outsourcing," where the rules are just being made, Gallo said.

On the other hand, she said, when software vendors raise a hue and cry about vigilantly guarding the only product they have, "I understand what the de-

voters are saying. It's so easy to cheat on your software licenses—and so some users do."

"The big fear [among vendors] 15 to 20 years ago, when the software industry began to grow up, was that the licensee would take this precious thing, this repository of all your rights, and hand it over to a huge data center," said a lawyer who represents large software vendors and requested anonymity.

"That's a legitimate concern: that's what the early model software-license language was drafted to prevent; and that's just what's come about."

Some users, the lawyer said, "take licenses as deeds of ownership, and say, 'Hey, I own this; I can do with it what I please.' Well, that's not right."

Here, again, the misunderstanding can be exacerbated instead of ameliorated by lawyers with an incomplete business-world view, Zahler said. Outside counsel, unseasoned in the ways of software licensing, sometimes "misconstrues expectations on the user's part," he noted. For instance, they allow or even lead users to expect that vendors will be responsible for financial losses the company experiences while using the vendor's software.

Integral set to fill out client/server strategy

BY JOHANNA AMBROSIO
CW STAFF

Integral, which plans to deliver its client/server software within the next month or so, is taking what some analysts are saying is a unique approach to migrating its mainframe human resources and financial software to a different architecture.

In December, the Walnut Creek, Calif.-based company announced HR Timekeeper, a Microsoft Corp. Windows-based package that updates and maintains payroll information on personal computers rather than on miniframes. Integral also announced Insuperactive, a Windows-based front end to the company's mainframe software that allows users to cut and paste data from Integral and other packages.

What makes HR Timekeeper different from other client/server packages, observers say, is an architecture that separates the application's functions from the platform they run on. This means the package can be more easily customized and regener-

ated to run on other platforms.

"The concept is a good one," said David Hill, a senior analyst at The Yankee Group in Boston. "It keeps the generic functions generic but allows the customers to incorporate their own special features as well."

With most packages, Hill said, users must redo all the customization work with each new release of the software. HR Timekeeper, however, keeps the user modules separate from the base software so users can simply reapply the custom work to each new release. "I haven't heard of anyone else doing this," he said.

Louis Wright, Integral's senior vice president of technology and development, said HR Timekeeper was built using KnowledgeWare, Inc. computer-aided software engineering products. This allows Integral to deliver information models along with source code to customers, who can "use the information model to the business, change the information model and regenerate the code." A future release of Timekeeper will allow users to regenerate applications directly

from the information model.

The company will use the same design concepts for all its client/server software, Wright said. "We know that technology shifts, so we're not tying business function to a particular platform."

The architecture also includes various services, such as a repository, security and translation of various SQL dialects.

The Ministry of Government Services in Toronto plans to install HR Timekeeper in 500 to 1,000 sites throughout Ontario, said David Ricey, director of the human resources information systems branch. It will be the ministry's first distributed human resources application, he said.

In the longer term, "it provides an opportunity to decentralize, to have many people keeping track of payroll information instead of its being done from only one location," Ricey said. The application will also help cut costs by doing part of the work currently handled by miniframes on PCs. The ministry is customizing the software and will roll it out in the summer.

Pricing for HR Timekeeper begins at \$10,500 and depends on hardware configuration and the number of sites and users. Pricing for Insuperactive begins at \$17,000.

Uncle Sam enlisting aid of software re-engineering

BY GARY H. ANTHES
CW STAFF

GAITHERSBURG, Md.—There are more crinkly old Cobol systems in the federal government than anywhere else, and Uncle Sam is turning to software

re-engineering as a relatively low-cost way to migrate old applications to more modern, powerful and open environments.

In a re-engineering test case conducted by the Internal Revenue Service and the National Institute of Standards and Technology (NIST), the agencies found that the effort took less than one quarter the time required to develop a comparable new system from scratch, but it proved a difficult process in several ways.

Software re-engineering involves the use of existing code and documentation to produce new software for the same application. It can be done to improve performance, maintainability, functionality or to move to new technology. "The IRS wanted to get some real-world experience with re-engineering," said Mary K. Ruhl, a NIST computer scientist who participated

Continued on page 56



Source: National Institute of Standards and Technology

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APPLICATION DEVELOPMENT

Per-user prices set for Oracle CASE

BY JEAN S. BOZMAN
CIVIL

REDWOOD CITY, Calif. — Oracle Corp. has extended per-user pricing to its computer-aided software engineering (CASE) tools. Oracle announced per-user pricing for Unix and personal computer server products last year.

Oracle CASE developers will pay only for the CASE packages they are using — not including the cost of an Oracle relational database. "For the first time, we have raised the price of a 4GL and [the] SQL*Net [communications package] into the CASE bundle price," said Renee Taylor, director of U.S. Oracle CASE marketing. "We've made it free to prototype and to test applications on the CASE workstation."

The entire bundled package for the CASE client workstation, including all modules, is priced at \$18,000 per user. All CASE users must purchase the CASE*Designer, which costs \$8,000 per user because it serves as the Oracle repository. However, the following modules may be purchased separately: CASE*Designer, an upper CASE analysis tool, is priced at \$8,000 per user; CASE*Generator for SQL*Forms and SQL*Menu is priced at \$3,000 per user; and CASE*Reporter for SQL*Reporter/Plus is priced at \$2,000 per user.

The bundled CASE packages are available for Sun Microsystems, Inc. workstations, for Digital Equipment Corp. computers running VMS and for Hewlett-Packard Co. computers running HP/UX. By April, Oracle plans to ship another version for Sequent Computer Systems, Inc. computers, Taylor said.

Graphics workstation vendor Silicon Graphics, Inc. recently endorsed Tooltalk, an object-oriented development tool from Sun Microsystems, Inc.'s SunSoft subsidiary. Silicon Graphics plans to ship Tooltalk services on its Iris four-dimensional systems by year's end. Introduced by Sun last year to allow applications to communicate across multiple platforms, Tooltalk has been selected by Lotus Development Corp., Clarify Software, Inc. and others as a foundation product for developing a networked message protocol for communications between applications.

Pressure weighs on KnowledgeWare

ANALYSIS

BY KIM S. NASH
CIVIL

Like Republicans in the White House, computer-aided software engineering (CASE) barreled into town several years ago full of promise but left many constituents feeling shortchanged. And like Democrats chopping at the GOP, pundits are on the CASE scene.

KnowledgeWare, Inc., which is neck and neck with Team Instruments, Inc. in the integrated CASE race, has taken the brunt of the bad-mouthing lately from users and industry analysts.

The Atlanta-based company's picture is not as bleak as some people paint it, but at the same time, the barbs are not unfounded. Both technological and financial difficulties are making potential customers hem and haw.

A quarterly loss

After costing on record sales growth for the three preceding quarters, the company reported a \$4.9 million loss on a 10% sales drop for the quarter ended Sept. 30, 1991. Except for generic written statements, officials refused to talk about the red ink, contributing to several Wall Street rumors.

Talk of falsy accounting habits and investigations by the U.S. Securities and Exchange Commission percolated throughout the industry but were never proven true.

Analysts said a combination of events could have caused the sales dive. Discounts spurred brisk sales of then-new modules ADW/RAD and ADW/DOC,

which boosted the balance sheet in the previous quarter. When the street prices went up, sales went down, said Ed Achy, director of software research at Technology Investment Strategies Corp. in Framingham, Mass.

Also, assimilating the three firms KnowledgeWare took over in 1991 — Language Technology, Inc., Quinsoft Corp. and UDM Technology, Inc. — took a toll on finances as well as product momentum, Achy said.

Technologically, users are concerned about an apparently flimsy commitment to Microsoft Corp.'s Windows. The company's ties to IBM as an AD/Cycle business partner also worry some customers. In the past 18 months, KnowledgeWare has added five products to its OS/2-based Application Development Workbench (ADW) line and none to its DOS-based Information Engineering Workbench (IEW) series.

IEW users "are finding out that to stay on the leading edge with KnowledgeWare, they now have to invest in OS/2 and ADW," said Dave Sharon, president of CASE Associates, Inc., a consulting firm in Oregon City, Ore.

Another problem cited by attendees at the recent CASE World show in Santa Clara, Calif., and other users is the

component nature of ADW and IEW. KnowledgeWare calls its lines integrated CASE (I-CASE), but users said the modules do not work together as smoothly as

McNamara said GE has had some success with KnowledgeWare's Construction Workstation, mainly because he formed a special development team that used it right from the start of GE's first CASE project in August 1989.

Coding with Construction "is a painful chore, but we get it done," he said.

But "no pain, no gain" is not what people want to hear. Users who chose TI's Information Engineering Facility (IEF) over ADW or IEW said KnowledgeWare's modules are not as in sync with each other as TI's.

Bright side

However, compared with the piecemeal approach — users mix and match tools ad hoc — the different stages of development from different vendors — KnowledgeWare products are integrated, analysts said. "You can go from design to code to testing and maintenance with them," according to

CASE pioneer James Martin.

Getting KnowledgeWare tools to talk to those from other big CASE makers such as Bachman Information Systems, Inc. or TI is tough, "so you're putting all your eggs in one basket for the next three to five years," said David Baird, application development analyst at Depository Trust Co. in New York, which has used ADW for two years.

Although he said he is confident that the new management will ultimately guide ADW and IEW development to reflect user wants, Baird is unhappy the line cannot work on a local-area network.

"It's horrendously difficult to consolidate information from different developers, but I have no reason to think that TI is one bit better," he said.

In fact, KnowledgeWare's woes are a microcosm of the trouble with the CASE market in general. Early adopters of the technology are bitter now, having expected more than the first wave of tools delivered. Dramatically decreased development time, simple application maintenance and the cost savings associated with such "canned" software have yet to materialize in a big way, according to users such as Baird.

KnowledgeWare retrospective



CIVIL Chart by Susan

other I-CASE offerings, especially at the code generation stage.

General Electric Co. in Bridgeport, Conn., has been a large ADW site since 1989. Still, GE used Micro Focus, Inc. Cobol to generate most of the 40 CASE-made applications it completed as of the end of 1991, according to Don McNamara, head of systems development.

APT upgrade receives mixed reviews

BY JEAN S. BOZMAN
CIVIL

EMERYVILLE, Calif. — Sysbase, Inc.'s new APT 5.0 Workbench tool kit, announced last month, was warmly received by APT 4.0 users. But some Sysbase users who have turned to other tool sets in recent years remain steadfast in their support of third-party alternatives, an informal survey of 20 sites showed.

Sysbase's new tool set addresses several graphical user interface (GUI) environments, including Motif, Sun Microsystems, Inc.'s Open Look and Microsoft Corp.'s Windows (CW, Feb 17). It has a translator that

uses APT 4.0 applications code and converts it for use with GUIs.

"I think it's a step in the right direction," said Ron Berolli, manager of systems at the Boned Abrasives Division of The Norton Co. in Worcester, Mass. Norton uses four Hewlett-Packard Co. Unix workstations running Sysbase to manage its manufacturing plants. APT 5.0 will help the firm in its ongoing migration to Motif applications, Berolli said.

Many of the earliest Sysbase users were Wall Street investment firms, universities and government agencies willing to overlook the APT's flaws to gain the performance of Sysbase's

DBMS, said Aaron Zornes, a senior software analyst at the Meta Group, Inc. in Westport, Conn. "The new tools will allow Sysbase to go after more traditional businesses that want to buy their databases and a single vendor,"

But some Sysbase users have grown used to other tool sets or use no tool kit. "We purchased APT two years ago and found it unacceptable in our environment," said James Daly, database administrator for the U.S. House of Representatives. "We don't think we'll be going back to APT." The House uses SYAC, Inc.'s JAM and Revelation Technologies, Inc.'s Advance.

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Uncle Sam enlists re-engineering

CONTINUED FROM PAGE 51

presented in the exercise and documented the results in a report, "Software Re-engineering: A Case Study and Lessons Learned."

The IRS chose a system used to schedule and track appointments between IRS auditors and taxpayers. It was written in 1983 using structured Cobol 74 for a Unisys Corp. 1100 computer. It included batch jobs, database queries and updates and on-line processing — 37 programs, 50,000 lines of Cobol and 2,738 lines of assembler language.

Part of the re-engineering process included porting the application from the Unisys environment and a DMS 1100 network database to an IBM mainframe running MVS and DB2.

CASE tools used

The firm contracted to do the work, Booz Allen & Hamilton, Inc., chose computer-aided software engineering (CASE) tools from KnowledgeWare, Inc. to re-engineer the process portion of the system and products from Bachman Information Systems, Inc. to transform the database from a network to a relational structure.

The effort started with reverse engineering, a process in which existing code, data and documentation were analyzed, and KnowledgeWare's design tool was used to produce new documentation. That documentation was then input to KnowledgeWare's application generator, which produced new Cobol code.

The project team found that the most time-consuming part of the effort by far was the mostly manual process of analyzing the existing system. "The most difficult thing is recognizing what you have, deciding if you still need it and, if so, how you might do it better," Ruhl said. That would have taken much longer had the project team not included applications experts from the IRS, she said.

The team found that the CASE tools were very effective in handling single batch programs, generating 96% of the new code for them. However, the more complex programs, especially the interactive programs that were mostly written in assembler, required extensive hand-coding to reproduce.

Ruhl said the CASE tools required more manual intervention than had been anticipated, and some processes were unexpectedly cumbersome and time-consuming. The off-the-shelf products were augmented with custom CASE software developed by Booz Allen.

As a result of the difficulties, the entire system was not completely re-engineered, but NIST

estimated the entire job would have taken 35 person-months, compared with 152 person-months to redo the system from scratch.

Booz Allen did a detailed comparison of the old and new code and found that the new programs

were considerably more complex. NIST concluded that there would be no problem as long as the new system was maintained at the design level, with changes always flowing through the same CASE tools. However, it could be a problem if maintenance ever

returned to manual practices, Ruhl said.

Mary T. Gunn, a computer scientist and co-author of the NIST report, said the re-engineering would result in the benefits of a "cleaner," more understandable system, updated documentation, relational database technology and a more mainstream, open environment. She said the exercise had shown

that software re-engineering could be a cost-effective way to extend the life of an application.

But Gunn cautioned against seeing the approach as a panacea. "Reverse engineering has been a real buzzword, and some people have felt it was easy and totally automated. But you don't want to just rush off and do it; you want to give it very careful thought," she said.





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NEW PRODUCTS

Development tools

Four Seasons Software has begun shipping SuperNOVA 3.0, an updated version of its database-independent application development software.

SuperNOVA includes a fourth-generation language; users

can create database applications that integrate data from multiple databases and run on multiple operating systems. The new version supports the Open Source Foundation's Motif as well as Microsoft Corp.'s Windows. A macro option, a dynamic menu-creation feature and enhanced support for distributed

processing are also included.

Prices range from \$990 to \$160,000, based on platform. Four Seasons Software
120 Wood Ave. South
Iselin, N.J. 08830
(908) 321-1650

JYACC, Inc. has recently ported its Jam application development tools to Quantum Software Systems Ltd.'s QNX real-time operating system.

Jam offers support for handling real-time interruptions such as data feeds and provides an open interface for attaching asynchronous functions. QNX runs on personal computers based on Intel Corp. processors and implements a microkernel architecture allowing applications processing to be distributed to multiple processors.

Jam for QNX costs \$3,000.

JYACC
116 John St.
New York, N.Y. 10038
(212) 267-7722

Utilities

Snow Software has announced Snow Report Writer for Digital Equipment Corp. VAX/VMS systems. The software can read files in more than 150 languages and file formats. It offers a cascading window interface.

The VAX version starts at \$2,154, based on platform level. The company also said it is developing an interface to connect its stand-alone report writer for Apple Computer, Inc. Macintoshes with a VAX server.

Snow Software
2390 Congress Ave.
Clearwater, Fla. 34623
(813) 784-6899

Software Partners/32, Inc. has announced the availability of Hierarchy, a storage management software product for Digital Equipment Corp. VAX systems.

Hierarchy provides automatic archival and retrieval of files to a variety of storage media. Files used less frequently are moved to off-line storage, though archived files appear to users as if they are on-line. Other features include an application safety net, which suspends applications that would normally fail because of insufficient disk space.

Pricing runs from \$3,000 for a VAXstation 2000 to \$21,000 for a site license.

Software Partners/32
447 Old Boston Road
Needham, Mass. 01963
(508) 867-6409

Computer-aided software engineering

CGI Systems, Inc. has created a bridge between its Pphase computer-aided software engineering tool set and the Information Engineering Workbench (IEW) from Knowledge Ware, Inc.

The bridge lets IEW users import design data into the Pphase multilevel repository. The repository includes automatic code generation facilities.

A site license costs \$24,000.

CGI Systems
1 Blue Hill Plaza
Pearl River, N.Y. 10965
(914) 735-5030

Check out the Product Showcase on Page 84.



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The Newspaper of IS

CASE tools pass benchmark

Late last year, *Computerworld* completed a series of performance benchmarks focusing on the integration of computer-aided software engineering (CASE) and fourth-generation language products. The benchmarks were designed and carried out by an independent consulting team at Computing

Futures Ltd., headed by David Whiteside and Professor Eberhard Rudolph.

For each of 11 products, the team conducted a three-day test monitoring the development of a project-costing system, a familiar application. It contained the general spectrum of commercial information facilities, ranging from multiple mainframe, complex transactions and external database interfaces to ad hoc queries and batch processing. The goal was to gauge the ability of each product to deliver complete and complex solutions under five-fire conditions.

The most indicative part of the case study related to maintenance of the project-costing system.

The required changes amounted to 60 Enhancement Function Points and included the modification of the data structure, layouts and business rules.

Conventional environments could take up to one non-year to fully develop the system.

Of some 17 prominent vendors invited to participate, 11 agreed to see the benchmark through to completion and "practice what they preach" in public, without safety nets.

The products were measured in six major categories, based on more than 100 detailed observations. These criteria were speed of development, speed of maintenance, integration of tools, level of completion, quality of documentation produced and quality of end-user language.

Different development environments and organizations have unique tool requirements. Each of the vendors had some valuable offerings but with varying degrees of strengths and weaknesses.

Here is a summary of the key benchmarks, including an analysis of the strengths and weaknesses of each product.

In addition, the summary includes comments from the vendors, many of whom have enhanced their offerings to address some of those weaknesses noted in the benchmarks.



The vendors respond

► Oracle Corp.: Oracle (Reviewed Nov. 26, 1990)

"Business rules can now be defined against Table Key Constraints and are enforced in generated applications. A Report-writer Generator has been introduced. The CASE Generator for SQL Forms now supports reverse engineering."

► Sapient Information Systems (Reviewed Dec. 17, 1990)

"A new version released in October 1991 adds the production of two-up reports and linking of edit fields. The project modeler CASE tool offers top-down and bottom-up integration."

► CGI Systems, Inc.: Pachase (Reviewed May 27, 1991)

"Development productivity grows over time as the Pachase repository is populated. A benchmark does not allow for this growth. Pachase also provides version control, configuration management and quality assurance capability."

► Must Software International: Nomad (Reviewed July 23, 1990)

"Our performance on speed and completion, along with the fact that the full solution was derived solely by Nomad, justifies a claim of leadership in productivity among this distinguished group of products."

► McDonnell Douglas In-

formation Systems International: Prokit/Pro-IV (Reviewed Jan. 21, 1991)

"The Prokit to Pro-IV interface is now much enhanced, greatly increasing the overall integration of the systems development life cycle vision of McDonnell Douglas."

► Texas Instruments, Inc.: IEF (Reviewed March 4, 1991)

"IEF Release 5.0 features multipoint support spanning environments from Windows 3.1 to MVS. It can generate an application for any supported platform from any supported construction platform."

► Computer Associates International: Ideal (Reviewed Dec. 17, 1990)

SUMMARY

Outstanding performances came from Oracle, Sapient and Software AG. Oracle achieved the most consistently high grades across the six categories, closely followed by Unisys.

Sapient provided the fastest results overall. Software AG, the first to enter, set a high standard. TI's IEF, a pure CASE tool, survived the test and can stand up to the established environments.

(Reviewed Aug. 27, 1990)

"CA now has a CASE tool, CA-Concept, that is integrated with CA-Datascan and CA-Ideal to speed the development process and enhance the production of documentation."

► Unisys Corp.: Linc Mapper (Reviewed Oct. 22, 1990)

"Mapper's latest release provides a modern look and feel that non-IS people can easily use."

► Software AG of North America, Inc.: Natural (Reviewed June 25, 1990)

"Software AG has increased the integration between Predict Case, Predict and Natural Construct, allowing increased functionality across the whole life cycle."

► Cincom Systems, Inc.: AD/Advantage, Mantis (Reviewed Sept. 17, 1990)

For each relational table, AD/Advantage can now generate 12 sets of SQL/DML that can be automatically included as program components. It also incorporates Xpertide, a knowledge-capturing tool that generates CA/Advantage program components for embedding in application systems.

► CA: Telen (Reviewed Sept. 16, 1991)

"The benchmark prototypes, instead of being exploratory, were indeed functional applications programs. CA-Telen Release 2.1 introduced automation for various batch maintenance functions."

Speed of development

	Poor	Fair	Good	Very good	Excellent
Oracle					
Sapient					
Linc					
Nomad					
Natural					
Mantis					
Pro-IV					
IEF					
Pachase					
Telen					
Ideal					

Five strong performers scored big in this category, which relates directly to the costs of developing the solution. Oracle completed the job most efficiently, while Sapient and Linc followed, with Nomad and Natural close behind them. Nomad scored well, but as a single developer tool, it necessitated a relatively longer elapsed time.

Speed of maintenance

	Poor	Fair	Good	Very good	Excellent
Sapient					
IEF					
Ideal					
Nomad					
Pro-IV					
Oracle					
Linc					
Natural					
Mantis					
Pachase					
Telen					

The Top 3 performing products have achieved their results in very different ways. Sapient's rule-based technique clearly delivered the fastest results; IEF took slightly more time but implemented changes from the design level. All remaining participants gave a strong performance in this important category.

Integration of tools

	Poor	Fair	Good	Very good	Excellent
IEF					
Linc					
Oracle					
Pachase					
Sapient					
Natural					
Pro-IV					
Mantis					
Nomad	N/A				
Ideal	N/A				
Telen	N/A				

IEF and Linc carried both data and program structures from the design stage to the implementation level. With the exception of Pachase and Sapient, all the remaining tools required an additional data dictionary at the implementation level. Nomad, Ideal and Telen did not field an upper CASE tool and could not be graded.

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EXECUTIVE REPORT

CUSTOMER CONTACT

Front-line systems

Despite a tough economy, retailers and others continue to test (and buy) new technology to keep old and new buyers happy



Saks Fifth Avenue's Neill says, "Customer service is one of the hottest things in retail today."

BY LARRY STEVENS

Perhaps only technology-minded customers will notice at first. But Sears, Roebuck and Co. officials are hoping that other shoppers will soon see a major change in how Sears cashiers ring up orders, issue charge cards, check payment records and handle other on-the-floor tasks. The Chicago retail giant has begun a \$53 million project to replace sales-floor terminals in 866 stores with new, more powerful personal computer-based systems.

Meanwhile, at archival Wal-Mart Stores, Inc., shoppers push around computerized shopping carts as part of a pilot program. When a shopper nears an advertised special, the "smart carts" display offers on a small on-board display screen.

Wal-Mart, now the nation's leading retailer, and still-struggling Sears are good examples of a quiet, but important ongoing trend in U.S. businesses today: using carefully selected "customer-contact" technologies as a strategic weapon.

Despite widespread downsizing, sophisticated new point-of-sale (POS) systems, handheld computers, self-service kiosks (see stories pages 64 and 65) and other new technologies are turning up at checkout lines, ticket counters, gas pumps and elsewhere with increasing regularity. Limping and sprinting firms alike are counting on highly visible technologies to keep old customers happy and new customers coming in the door.

"Customer service is one of the hottest things in retail today," says Stewart Neill, vice president of information systems at Saks Fifth Avenue, the New York-based retail chain. "A new measure of the success of IS is how it improves our relationship

with customers."

True, says David Carlson, senior vice president of corporate IS at Kmart Corp. Carlson says that over the past few years, his company has been looking at customer-contact systems with a new intensity. "A good deal of IS time and attention is now directed on how to place technology out where we meet the customers," he says.

The idea of using information technology to improve customer satisfaction is not new, of course. Self-service and other approaches have become more popular since banks began installing automated teller machines in the early 1970s.

Strong interest

But what's notable today, according to consultants and IS managers, is the strong commitment to customer-contact technologies — at a time when many low-margin industries are hurting badly.

Investment in presses customer support systems has dropped slightly, according to CSC Index, Inc., the Cambridge, Mass.-based consultancy. Still, many firms continue to place heavy emphasis on customer-contact technologies (see chart page 63). In many cases, these systems represent just the tip of the iceberg. A few recent examples include the following:

- Sears, recently deposed after more than a century as the nation's top retailer, is installing 28,000 custom DOS-based PCs in its U.S. and Puerto Rico stores. Company officials say the move will trim 7,000 jobs and cut expenses by \$50 million a year [CW, Jan. 13].

- Blockbuster Entertainment Corp. has been expanding its use of information technology in its 1,900 video stores worldwide. The latest phase: testing in-store "movie stations" based on IBM Personal System/2s and touch screens [CW, Feb. 24].

- Au Bon Pain, a 100-site chain of cafes and fast-food stands, revamped its information systems, among other things, to better link its NCR Corp. cash registers with a core processing system [CW, March 18, 1991].

- Friendly Ice Cream Corp., an 800-store chain based in Willsboro, Mass., announced in January that it would install new POS devices, application software and between 150 and 200 Digital Equipment Corp. PCs.

Diverse companies such as Burger King Corp., Marks & Spencer PLC, Mobil Oil Corp. and Amoco Corp. have also installed new or revamped customer-contact systems in recent months. The common goal is faster, easier, better service.

This strong corporate interest in placing high-payoff technology in front of customers has not gone unnoticed by industry vendors. Last July,

Continued on page 62



Customer Contact

KEY POINTS

- Major challenges for IS include weeding out novelty technologies, designing user-friendly systems.

- Kmart, Wal-Mart and Saks Fifth Avenue are among national retailers testing new technologies such as smart carts.

- Lechmere has introduced self-service kiosks in 11 of its stores. Company officials hope the PC-based systems will shorten lines and improve customer satisfaction. See story page 64.

- New Mexico officials plan a July rollout of U.S.-based information kiosks that they hope will boost tourism, save on labor. See story page 65.

- A Virginia firm wants to bring POS technology into U.S. living rooms. TV Answer is busy assembling the information and satellite technology needed to make interactive TV a reality by early 1993. See story page 66.

QUOTABLE:

"A good deal of IS time and attention is now directed on how to place technology out where we meet the customers."

David Carlson
Kmart

Stevens is a free-lance writer based in Milson, Mass.

Companies continue to test new technology to keep buyers happy

CONTINUED FROM PAGE 61

IBM, Videocart, Inc. and Information Resources, Inc. announced an agreement to produce electronic shopping-cart advertising technology. The deal specifies that IBM will design and produce at least 120,000 units, plus software for electronic discount coupons and other applications.

DEC last fall introduced DECcartian, VAX-based network software designed to help companies integrate POS and head-office systems from different vendors [CW, Sept. 23, 1991]. Around that time, NCR announced the NCR 5980, an entry-level POS peripheral for signature capture. Northern Telecom, Inc. announced a new data service in June that it says cuts credit card approval time for stores from 30 seconds to seven.

Out of the woodwork

Even lesser known players are getting into the act. Tesco Corp. in Akron, Ohio, recently introduced a new family of wireless, portable POS computers that communicate with store computers via radio frequency. Another small firm, Cellular Data, Inc. in Palo Alto, Calif., last summer announced testing of a wireless credit card verification and authorization system that uses cellular technology.

With more products available, consul-

ants and IS managers say a big challenge is distinguishing exotic technologies from those that will pay big dividends, such as higher profits and happier customers.

"These new technologies are something that everyone is interested in exploring," says Steve Johnson, managing partner at Andersen Consulting's retail industry practice in Chicago. "But companies want to be sure the system will provide real benefits before they roll out a full-fledged system."

"There's not a lot of margin in the retail industry," notes Tom Rauh, partner and regional director for retail services at Ernst & Young in New York. "Flashy technology with dubious bottom-line advantages will be hard to carry through on."

But tough cost-justification pressures haven't prevented forward-looking companies from investigating new customer-contact technologies and approaches.

At Bentonville, Ark.-based Wal-Mart, Bobby Martin, executive vice president of IS, likens the new interest to the explosion of POS systems a decade ago. "Back then, bar coding was innovative," he says. "But to be strategic today,

scanned data has to be combined with other customer-contact systems and with backroom operations, such as new distribution systems and customer databases, to provide a higher level of service."

One of many current efforts to stay ahead is an experimental program using computerized shopping carts in test

specialized store host processor. Cart locations are constantly tracked with an in-store infrared grid.

Martin cautiously voices high hopes for the infant project. One possibility is to link the carts to corporate databases, which capture invaluable data about individual customers for mailings, store coupons or faster shelving of "hot" items.

Despite the possible benefits, he remains cautious. "So far, [the project] doesn't add the kind of value to customers that will be necessary in order to make it more than a novelty," Martin says.

Still, most companies are keeping tight-lipped about new technologies being evaluated. Wal-Mart, Troy, Mich.-based Kmart and Sales acknowledge that they are working on new systems that will capture and use customer information for special promotions, mailings and more targeted stocking of products. All three also say they are considering or testing self-serve kiosks but won't reveal much more.

Kmart is the first national discount chain to experiment with computerized mapping of customer traffic. The retailer is testing Shoppertrak, a system developed by Datacube Industries in Fairfield, N.J.

From the time customers at the Kmart store in Westwood, N.J., enter the store until they leave, they are electronically tracked by ceiling-mounted scanners, which send data about traffic to an



National Car Rental's Livingston says it recouped its investment in Smart Key in a year.

stores. Each shopping cart, produced by Videocart, carries an Intel Corp. 80286 processor and a 6-by-8-in. LCD display. The processor communicates via RF to a

Just A R

in-store terminal. Company officials say Shoppertrak will be used as a real-time system to alert store managers to the need for more sales assistance in specific departments.

Saks is investigating a new full-screen POS system that company officials say they hope will shift many tasks from cashiers to salesclerks. Now, customers typically have to visit several departments, such as credit or ordering, to get information salesclerks could obtain from one POS screen.

Eighteen months ago, National Car Rental System, Inc. in Minneapolis introduced "Smart Key Machine" to more than 100 locations. The touch-screen system, based on a Hewlett-Packard Co. Vectra PC, lets customers rent cars without staff assistance.

Because systems are linked by 9.6K bit/sec. modems to a corporate DB2 database, customers can pick up keys in one city and return them in another, says National's chief information officer, Jack Livingston. Besides improved efficiency and customer service, Livingston says, the system has also cut personnel costs. Project costs were recouped in a year, he adds.

While consultants applaud such experimentation, they predict that many technologies will ultimately be deemed too expensive, unneeded or both. POS devices and other integrated systems are given the best chance at surviving, say standalone devices the worst.

Lots of flesh, less cash

Planning companies show varying degrees of interest in new customer-contact technologies



	Currently using	Plan to test in 1990	Plan to implement	No plans to implement
Proposed customer/buyer programs	21%	8%	38%	43%
Windows 3P hand-held terminals	20%	6%	32%	41%
Interactive presentation-based video displays	9%	4%	9%	79%
Video kiosks	9%	3%	6%	82%
Digital cards	9%	6%	14%	71%
Interactive display systems	6%	3%	10%	81%
Electronic shelf tags	4%	3%	13%	81%
Two-dimensional bar-coding	3%	2%	9%	86%
Self-checkout	1%	1%	5%	94%

Percentages of responding retailers have been rounded. Base: 154

Source: Ernst & Young/Chain Store Age Executive

CW Chief: Michael Higgins

"Star Wars-like customer-contact systems are fun and capture customers' and the media attention for a while," says Robert Salerno, a partner at the national retail consultant group at Coopers & Lybrand in New York. "But the benefits are limited."

New IS challenges

Regardless of what technology survives, experts say new customer-contact systems will create new issues and challenges for IS. A big task will be to work

even more closely with business units in planning and implementing new, useful systems.

New technologies are often brought into the chain with varying levels of IS involvement. For example, Ralph's Grocery Co. in Los Angeles recently installed a computerized system called Checkout Coupons in its 159 stores with "virtually no IS involvement," says Terry Potts, the chain's senior vice president of marketing.

The service, offered by Catalina Marketing Corp. in Anaheim, Calif., ties into each store's POS system, then prints custom coupons at each register based on shoppers' purchases. A person buying one cereal brand at checkout time might get a discount coupon for a competing brand.

Potts views the fact that no IS help is needed "as a plus for us, since there's no cost and a lot of benefit." However, experts warn that unless IS is more involved in such projects, companies run the risk of having different departments creating islands of customer-contact automation that will ultimately not use technology to its fullest advantage.

Kmart is working to avoid such problems by creating a Customer Service Research and Development Steering Committee. Many of the group's members have systems backgrounds and were chosen for their breadth of knowledge about business issues.

The chain's pilot shopper-tracking system does not require IS involvement. But it is compatible with Kmart's KIN II state-of-the-art, in-store processing system, so Carlson sees the possibility of a future tie-in. "Through Shoppertrak, we will not only improve service in the store on a minute-by-minute basis, but we will be able to compare customer contact information with point-of-sale data," he says.

Another big challenge, according to Saks' Neill, will be to work with business units to guarantee maximum ease of use.

"If you give the salesclerk the ability to serve a customer but then create a situation where the customer is waiting 10 minutes while the clerk figures out how to use the system, you've failed," he says. "Technology at the point of customer contact is causing us to introduce radically new standards of user-friendliness."

Salerno agrees: "The biggest risk with technology is not the cost but rather that the system will not be used because it's not needed or the presentation is wrong."

Ultimately, the best approaches and systems will be decided by shoppers, Martin says. "They'll tell us when we're going too far. As long as we move slowly and carefully and ask questions along the way, we should be able to build the systems that the customers want." ■

Reminder That We've

Lechmere offers kiosk system worth checkin' out

BY DEREK SLATER

For winter-weary bargain hunters, waiting in store checkout lines can be as frustrating as sitting in a rush-hour traffic jam. That's why Lechmere, Inc., New England's largest "hard lines" retailer, has given shoppers the option of helping themselves via information technology.

The Woburn, Mass.-based chain (1991 sales: \$670 million) recently finished installing sales kiosks in 11 of its 20 stores. Dubbed "Lechmere Express," the personal computer-based transaction kiosks let customers purchase home electronics, appliances, sporting goods and other merchandise without waiting in line for an available cash register.

Lou Kleynen, Lechmere's director of corporate information systems, says the main reason for installing the squat, blue kiosks was to improve customer service. Higher sales was a secondary goal, adds Stan Smith, director of distributed systems.

Completed last October, the project took about one year to design and implement. Company

officials would not disclose the cost of the project.

Each kiosk consists of an Intel Corp. 80386-based PC, a touch screen, a credit card reader, a small speaker and a receipt printer. Siemens-Nixdorf Information Systems, Inc. in Burlington, Mass., supplied hardware and systems integration.

To use the system, the buyer touches the screen and works through a series of colorful, interactive menus. After providing the item number and quantity, the

shopper runs a credit card through the slot, waits a moment for a printout, then goes directly to the pickup window.

The kiosks are linked with existing IBM RISC System/6000 servers in each store that quickly let customers know if an item is in stock, officials say.

Because the RS/6000 units and inventory databases were already in place at each store, implementing Lechmere Express required little extra equipment beyond the hardware for each kiosk and a software/hardware interface between the Siemens Nixdorf PCs and servers.

Smith says Lechmere had considered self-service for several years. The project took off after company IS employees saw a trade show demonstration of music kiosks that let customers hear sample songs before purchasing an album. Lechmere management liked the idea and soon set in motion its own plan. A prototype based on Lechmere's design was developed in three months, written by Siemens Nixdorf.

The pilot was tested in Lechmere stores in Cambridge, Mass., and Nashua, N.H., for several months. Customer surveys showed that 90% liked the system and found it easy to use, Smith says.

Nonetheless, changes were made based on observations of

SELF-SERVICE

beta-test users. For example, colors were changed to red, white and blue, and waiting time between screens was decreased.

At present, not every item can be purchased via Lechmere Express; eligible items are marked by special tags.

Teamwork key

Smith says one big reason for the prototype's success was close cooperation between IS and the company's Visual Marketing Group, which helped design the interactive screens.

Company officials are reluctant to discuss concrete benefits, but they say one big advantage is that Lechmere Express lets customers skip two potentially time-consuming steps: finding a salesclerk and standing in a cash register line.

David Fishman, a vice president at Cambridge-based consulting firm Arthur D. Little, Inc., says Lechmere Express should help battle the classic retail problem: keeping lines short without overspending on help.

"When people go to retailers, they don't expect to wait in long lines," Fishman says.

While automation can aid customer service, Kleynen says, kiosks must be seen in perspective. "Information technology is one small part of the puzzle," he says. "Certainly we can't run our stores without concerned employees as well." ■

Slater is Computerworld's new products writer.



Lechmere Express: Consumers can purchase merchandise without help of cashiers

Been Printing Long

Electronic tourist info

New Mexico officials hope video kiosks will promote tourism

BY ALICE BREDIN

Visitors to New Mexico's tourist centers and airport this summer will encounter what look like fancy automated teller machines. But be warned: These systems dispense information, not cash.

By the end of July, the state will roll out nine Unisys Corp.-based media information kiosks at tourist centers and at Albuquerque International Airport. The Unisys-based touch-screen systems will use full-motion video, audio and graphics to help visitors decide what to do in The Land of Enchantment.

"With the economy the way it is, we couldn't hire new people to sit 24 hours a day and know the answers to all of these tourism questions," says Gerald Mora, a systems analyst manager at the New Mexico Department of Economic Development in Santa Fe.

The project was carried out by a five-member team at the University of New Mexico Engineering Research Institute, which handled technology evaluation, cost and user-resistance analysis and also wrote usage-tracking software.

Previously, the state had used paper pamphlets for tourist information. Now, a visitor interested in outdoor activities, for

example, needs only touch a screen to get electronic information on such topics as "Playing in New Mexico."

Mora says the team discovered early on that hardware and software choices were limited. Although IBM and Commodore Business Machines, Inc. filed proposals, the contract went to a Unisys ST1000 terminal linked to a Unisys Personal Workstation 386SX personal computer running DOS.

Unisys was, Mora says, because of its self-contained unit, security features, statewide support and growth possibilities.

Each of the 215-pound systems costs about \$15,500, which includes a 44-in.-tall main kiosk (about 3½ sq ft), 386SX processor, power supply, color IBM Video Graphics Array monitor, touch screen, video laser disc player, loudspeaker, 52M-byte disc drive and 2M bytes of extra memory for increased application throughput.

The kiosks use Quest software from Allen Communication, Inc. in Salt Lake City. The video presentation was created by Mediadesign, Inc., an Albuquerque video consulting and production firm.

New Mexico Department of Tourism and state information systems officials

say they realized that automation was the only way to offer visitors more information with limited funds.

The budget for two pilot systems, tested at the airport from November 1990 to May 1991, was

\$275,000. By far the biggest cost was for software and videos — about \$190,000.

Mora says he considers the money well spent.

"Expanding tourism is a big part of the state's economic development plan," he says.

The big issue now is whether to invest the money needed to constantly update systems calendars. One alternative for the state is to change only the text, which other cities and states have done.

It is not always easy, however. The city of Pasadena, Calif., ran a six-month test kiosk program beginning in March 1990. The state Supreme Court system was designed to help people find departments and services in the court building. But the project went bust.

Pasadena officials say the program could not be easily changed. Even though Apple Computer, Inc. had donated hardware and software for the pilot, the labor costs of updating the system were simply too high, according to July Kopitnik, a

business systems consultant for Los Angeles County.

"Every time we wanted to change something, we would have had to go back and work in [Apple's] Hypercard to

SELF-SERVICE

In July, nine multimedia kiosks will guide visitors

change it. Updating needs to be easy before kiosks will really take off," she says.

Despite such problems, kiosk sales are expected to jump in the next few years, according to Inteco Corp., a consulting firm in Norwalk, Conn.

"Once people get used to the idea of kiosks, more sophisticated machines will start to sell," says Russ Maines, a consultant at Inteco. ■

Bredin is a free-lance writer based in New York.

er Than Any Other

Living room technology can deliver pizza to your door

BY EMILY LEINFUSS

Imagine you're in your favorite chair, eyes glued to the television. An ad for a hot, savory pizza appears before your eyes. Stomach growling, you grasp the joystick tucked next to your beer, point and click onto a series of on-screen menus. Presto! The pizza is ordered for delivery to your home within 30 minutes.

Sound too easy? Not to TV Answer, Inc., a Merrifield, Va., company preparing to launch what might be the ultimate in customer-contact technology: a nationwide, two-way interactive video and data service.

Last Thursday, the company officially announced the product with its new partner, Hewlett-Packard Co., which will manufacture, market and distribute TV Answer. Analysts say the deal represents a half-billion dollar commitment to interactive TV by HP.

By 1993, the partners plan to provide a service that will let viewers order local take-out food, pay bills, bank and participate in polls, all by way of their TV sets.

What's more, says Don Lintvet, TV Answer's executive vice president of marketing, the service will also open up new worlds of interactive network and cable TV. For example, viewers could play

along with *Wheel of Fortune*, he says, or try to second-guess plays in the Super Bowl.

"This service means new levels of audience participation, greater market share for advertising and a whole new industry in interactive TV game shows," Lintvet says.

TV Answer hopes to have 1.5 million home units wired during its first year of operation and 20 million units within five years. The company took out full-page ads in *The Wall Street Journal* last month heralding its planned service.

The development is notable for several reasons, not the least of which is the company's faith in interactive technology. While many companies are deploying information technology at the point of customer contact, very few have based an entire business on it — and none successfully.

One thing TV Answer shares with earlier plans, says Bob Alexander, an industry consultant and president of Alexander Group in New York, is abundant optimism, especially if home units are priced above \$100 or so.

The TV Answer system is a wireless, instantaneous transmission network that involves four components: a home unit, a local cell site, the satellite and a central



Planned two-way satellite communication will let viewers order take-out food, pay bills, do their banking and participate in various polls — all via their TV sets

hub site (see story next page). The home hardware portion of TV Answer is expected to cost about \$700.

Still, the new firm is confident. The company says it sees the enormous popularity of the 900 phone number as a strong indicator that the idea will take off.

Six years in the making

Although officials say TV Answer has been developing and testing interactive TV since 1986, the company announced

its nationwide launch Jan. 16. That was two weeks after the Federal Communications Commission unanimously approved allocation of a 1-MHz radio frequency spectrum, formerly limited to maritime use, for the development of interactive TV.

The company is now busy laying the groundwork by developing contacts with retailers and service providers, as well as with TV and cable networks. It is also awaiting FCC approval for local licenses.

Laser Maker.

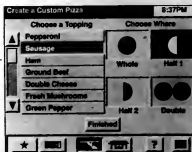
To support the service, TV Answer is starting to design and equip a corporate data center in Reston, Va. Bob Chiaramonte, vice president of information systems, says the center will be equipped with a fault-tolerant transmission switch and CPU power that has distributed intelligence.

When complete, the center will serve several functions, including processing transactions received at the hub, applying industry standards in encryption and decryption techniques to every transaction and switching transactions to the proper provider of goods and services.

Even if TV Answer can assemble the complex technical infrastructure needed to provide its service, it will not be home free. Alexander notes that other competitors are working on similar systems, although TV Answer has a jump. "Its single strategic strength is that it's a cellular radio model, which means it can have community-based users," he says.

Local services likely to succeed
That said, Alexander adds he believes there's a decent chance that local services can catch on. Market demand for electronic purchase of goods and services on a

local level has been demonstrated, he says. It is more feasible and far less expensive to promote local shopping, which is already in demand, than to generate de-



Couch potatoes can use on-screen menus to order custom-made pizzas for home delivery

mand to play along with a game show to win a million dollars.

According to company officials, subscribers will be able to preview a whole day's worth of programming on their videocassette recorders and automatically set up for recording. There are other uses as well, they add. For example, banks can set up "branch offices" in each home, allowing subscribers to check balances, transfer funds and pay bills. •

Leinfuss is a free-lance writer based in Sarasota, Fla.

What makes TV Answer tick?

Consumers access the TV Answer system by transmitting instructions to their home unit with the help of a joystick programmed to activate an on-screen menu.

The home unit relays the signal via radio waves to a local cell site, which translates it and transmits it to a satellite. The satellite then transmits the signal to a national hub site at TV Answer headquarters in Merrifield, Va. The signal is relayed through its transaction switching center to goods and services providers around the nation for fulfillment.

In the home, the two-way send/receive unit hooks up to the TV via cables. The unit houses an Intel Corp. 8048 processor that runs a proprietary operating system developed by TV Answer. Software is delivered to the unit via memory cards, which activate the system, store updatable information and provide additional memory capacity and specific services to users. Each memory card provides one or

more user services, such as banking or shopping.

The unit programs the TV set to provide service options and collect instructions from users. During the setup phase, the user can program in a credit card account and receive a personal identification number.

Payment can vary. During a sporting event, for example, promoters might ask the end user for money to play. If a viewer indicates interest in a retail product during a commercial, the seller might pay the transaction fee for the consumer. In either case, TV Answer hopes to make money. No matter what the service, it is paid for by the service provider as a middleman offering a way into, and out of, consumers' homes.

After an in-home transaction is complete, the unit transmits the instructions/data via a VHF RF wave to a local cell site, which houses the hardware and software needed to collect, process and transmit data and instructions between the home units and TV Answer headquarters.

Satellite transmission is handled by Hughes Communications Corp.'s Slimnet System. The cost of a cell site development is about \$30,000. The setup includes a 6.1-meter satellite dish that interfaces to a Digital Equipment Corp. VAX 4000. The hub processes and transmits data and instructions between TV Answer corporate headquarters and two receivers: goods/services providers and local cell sites. The hub site costs \$2.1 million to develop.

EMILY LEINFUSS

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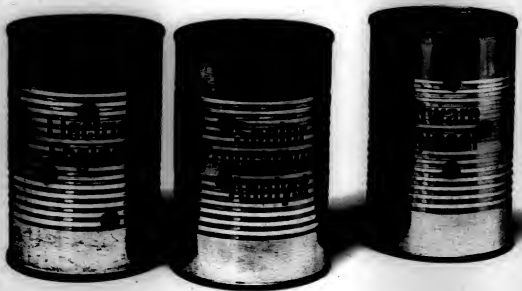
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IN DEPTH

Value judgment

IS chiefs in the distribution arena say money comes to those projects that improve business basics — inventory, order processing, delivery, customers

Part of a continuing series that looks at how particular industries go about assessing the value of information technology.

BY CLINTON WILDER

If speed, efficiency and customer service are the most important competitive differentiators of the 1990s, then the distribution function makes an excellent business showcase. It's the area in which these endeavors really come together — the heart of the pipeline.

Whether you're talking about distribution companies or retailers' and manufacturers' distribution function, information technology is an integral part of making distribution faster, easier and more customer-oriented.

Information systems consultant M. Victor Janulatis, president of Los Angeles-based Positive Support Review, Inc., puts it bluntly: "In today's distribution industry, you are brain dead without computers."

Core benefits

Although most distribution companies agree that technology is essential to their business, they have many different ways of measuring its effectiveness. To determine the business value of a given technology, most companies ask: "Does it support the basics of our business?" Those basics may include shortening delivery cycles, streamlining the ordering process and making better inventory information available to customers.

"If you're in mainline distribution, you have to do the basics the best," says Mike Kelly, senior vice president of MIS at personal computer distributor Ingram Micro, Inc.

To gain a sense of how distributors value their IS investments, *Computerworld* brought together Janulatis, Kelly and five other Southern California IS executives to share their views in a roundtable discussion.

VALUE POINTS

In distribution, IS projects are valued according to how well they advance the following goals:

- Enabling business strategy.
- Improving customer information and service.
- Improving measurement of customer satisfaction.
- Increasing speed of distribution.
- Eliminating paperwork and automating manual processes.
- Delivering information as part of the service.
- Improving system uptime and reliability to support service.



Roundtable participants: (standing, left to right) Decker, Kelly, Kislowksi and Wride; (seated, left to right) Kroner, Janulatis and Johnson.

The other executives are as follows:

• Chuck Decker, director of MIS, Food Service Division, Bunt Distribution USA, Inc., City of Industry, Calif.

• Stan Johnson, director of MIS, The Port of Los Angeles, San Pedro, Calif.

• Richard J. Kislowksi, vice president of information services, Pacificare Health Systems, Inc., Cypress, Calif. Kislowksi worked for several years in IS in the distribution area at Denny's, Inc.

• Carol J. Kroner, vice president of information services, Western Waste Industries, Carson, Calif.

• Evan L. Wride, director of IS, Nissan Motor Corp. U.S.A., Carson, Calif.

At Nissan, IS is now evaluated on its ability to make possible the new distribution strategy business executives have put forth, instead of how well it responded to system requests from corporate headquarters. "Our slant has changed significantly," Wride says. "We are much more market-driven and measured by how well we [in IS] support customer service. It really is a question of how fast you can put a quality system in place."

To respond to growing global competition, Nissan wants to cut delivery cycles and enable dealers, rather than regional managers, to order the cars their customers want. For Wride, that means integrating an order-entry system throughout the enterprise, from individual dealers to corporate headquarters to factories in Japan, Mexico and Tennessee.

Information is key

"It's an intuitive thing — we're going to need a distribution mechanism, and the only way to make that work is to have the information," Wride says. "All they want to know is, 'How much money is it going to take to build it, and when can we have it?' Hitting the delivery date is the key measurement."

If anything, Wride adds, it's a IS that has been the conservative one. "Business executives tend to want to automate this thing from A to Z, while we're saying, 'Let's automate from A to M so we can get it done in one year instead of two.'"

For Johnson at The Port of Los Angeles,

Continued on page 70

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the key to getting funding for projects is relating them to some customer benefit. "If I'm not able to relate [an IS expenditure] to a customer activity, it's very, very difficult to sell it," he says. Johnson directs the port's IS operation, whose activities range from providing computer-aided design tools for dock configurations to updating software immediately with mandated tariff changes.

Winning new customers is important, but keeping old ones is probably even more so. The part IS can play in measuring customer satisfaction and enabling quick response to problem areas is critical to getting needed technologies, roundtable participants say.

"Customer sampling is no longer acceptable; it must be a 100% check," Kislowksi says. "The time window has shrunk drastically. You need to find your individual complaint and [show how technology can] turn it around right then and there."

For example, an automated distribution system at Denny's enables clerks to log in "outages" — each time a franchisee requests items that are out of stock. The value of the system is that management is able to measure how much they are losing in potential sales due to outages, Kislowksi says.

The value of IS at Ingram Micro is measured by the fact that it can ship 99.98% of its products the same day that they were ordered; Buntz is close behind at 99.7%.

At Buntz, "We have contracts guaranteeing our customers that service level, and if they don't get it, we have repercussions financially in terms of discounts we have to give," Decker says. "We have lots of systems in place that support that."

Value-added marketing

Information to support marketing efforts is also highly valued. The Port of Los Angeles is prototyping a system that would enable representatives in its overseas marketing offices to simulate different cargo unloading configurations for potential foreign shipping customers.

"They could sit down in Taiwan or Kowloon and offer different options, transmit them back and get a cost estimate very quickly," Johnson says. "We're in a very competitive situation [with other West Coast ports], and that helps a lot."

To help justify technology and tie it more closely to the business, Johnson has formed an IS policy committee of high-level executives from the port's divisions, which include finance, administration, personnel and maritime affairs. He can prioritize their various technology requests before going to the port's board of commissioners for budget approval.

"If I can go to the board with that kind of clout, it's much more effective than just Stan Johnson building his empire over here," he explains.

Informational advantages

Adding value through technology can also occur in the form of collecting information as part of the distribution service itself. At Denny's, Kislowksi's organization could break down the sales of Coca-Cola syrup by area, then "sell" the data back to The Coca-Cola Co. in the form of a discount on the product for Denny's.

Managers in Denny's purchasing department went to the IS department to see how it could break down the Coke purchasing data. Kislowksi's staff showed

them database cuts by all kinds of criteria, including the regional breakdown that Coca-Cola managers wanted to see.

"No other restaurant chain could give Coca-Cola that because no other chain had a national picture of distribution," Kislowksi says. "That test is a lot of credence to the concept of soft benefits. It was the first time someone could show in dollars and cents how valuable that information was."

Don't be late

Kislowksi adds that business managers who demand more traditional cost/benefit analyses before committing to particular technologies might miss out on such value added. "That's the kind of thing you never see in a cost/benefit analysis."

Management expectations of how much IS can deliver to the business can

Nissan, when a top business executive wondered why the automaker couldn't provide integrated customer information — sales and service history, leasing or financing status, other potential buyers in the family — the way his life insurance company did.

"So we're going through all the harangues now to integrate all that," Wide says. Those harangues include changing the old value system as well as the old information system. "It used to be that Japanese cars sold themselves. Now customers want to order much more specifically, and the only way to do that is to enable dealers to order. That's a brand new thought process for the Japanese."

Kromer, who has worked in IS in the banking and trucking industries, finds herself dealing with *tabula rasa* management expectations at Western Waste, a

their approaches to experimenting with emerging technologies. At The Port of Los Angeles, Johnson includes in his PC software budget an amount for new technologies. They are brought in on a one-of-a-kind basis and can be requested by either users or IS.

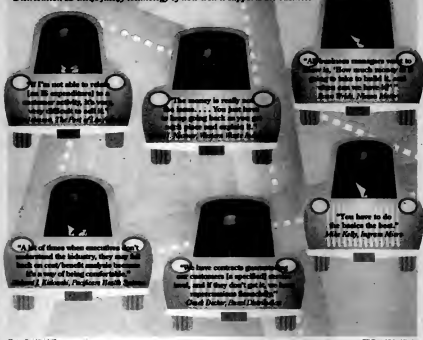
Senior management "sees it as a prudent thing to do — buy one, and check it out," Johnson says. Compact disc-read-only memory technology introduced in this way now houses much of the port's data on materials safety and international maritime policies.

At Nissan, however, Wide does not purchase IS technology without a predetermined business reason. "It has to be driven by an application that the business process is looking for," he says.

Ultimately, measuring the value of IS in distribution is no great mystery, round-

All the right moves

Distribution IS chips justify technology by how well it supports the business



Photos David Jack/Orion

CW Chart: Michael Higgins

very widely. In the distribution function at Denny's, Kislowksi recalls meeting with executives who joined the firm from American Hospital Supply Corp., with its industry-leading ASAP order-entry system.

"They said, 'Why can't you tell me what's in inventory and what's on the road coming here and what's in the distribution centers?'" Kislowksi says. "They knew we could do better; that was an expectation. A lot of times when executives don't understand the industry, they may fall back on cost/benefit analysis because it's a way of being comfortable."

That expectation of better information spurred the spending for IS and development of the systems to support Denny's distribution, Kislowksi says.

Wide points to a similar experience at

small solid waste company. Although not traditionally known as information-intensive, the trash pickup and hauling industry is becoming much more so with increasing environmental regulations and mandated recycling programs.

Back to school

Kromer says she must educate her own management about IS needs. "The money is really not the issue, and there is no budget. You just have to keep going back as you get each piece and explain it to managers who are really creative entrepreneurs," she says. "I just got a request for proposals where the amount of work involved in hauling and in IS are now the same. Management just can't grasp this."

Perhaps the hardest technologies to justify are new ones. Participants differ in

table participants agree. Distribution companies do not dispute the criticality of timely information to their business mission. So IS initiatives are launched and judged on making the distribution process, in Wide's words, "better, easier or faster."

Positive Support Review's Jansulita agrees that business and IS measures have become intertwined. Smooth, efficient, error-free and customer-friendly distribution is the hallmark of business success, and it must be enabled by IS in today's world.

IS value is measured by how well it furthers that goal.

"The inward measures of IS today," Jansulita says, "are not data processing transactions per hour but business transactions per hour." ■

MANAGER'S JOURNAL

EXECUTIVE TRACK



Douglas E. Kabel has been promoted to a senior vice president in the Information Technology and Bank Operations Division at Fleet/Norstar Services Corp., the corporate services subsidiary of Fleet/Norstar Financial Group in Providence, R.I. Kabel, 45, has spent his entire career at banks that are now part of Fleet/Norstar. He had been a vice president at Fleet Norstar Services since it was established in 1989. Kabel holds an undergraduate degree from Hobart College and a master's degree in industrial management from Clarkson University.

Patricia M. Wallington was named vice president of MIS at Xerox Corp. in Stamford, Conn. She replaces Patricia C. "Tosh" Barrow, who was recently named president of Xerox's new Office Products Division (CW, Feb. 10).

Wallington has been vice president and chief information officer at Xerox's Rochester, N.Y.-based U.S. marketing group since October 1989. Before that, she was senior vice president at Massachusetts Mutual Life Insurance Co. and a director at Sun Co.

Wallington will serve as president of the Society for Information Management (SIM) for the year beginning July 1. The first woman named to lead SIM, Wallington has been an active SIM board member for several years.

She holds a bachelor's degree in accounting and finance from the University of Pennsylvania's Wharton School and a master's degree from DePaul University.

James Heck was promoted to director of systems and programming at Programers Investment Corp., a direct marketing service bureau in Des Plaines, Ill. He is responsible for all of the firm's IS needs.

Heck was most recently manager of systems development.

Ignore archive issues at your peril

CIOs who neglect records management risk getting clobbered in court

BY MITCH BETTS
CW STAFF

Former presidential security adviser Oliver North learned about records management the hard way. He thought his 1987 shroud-and-purge party had destroyed the damaging memos of the Iran-Contra scandal, until a computer-savvy investigator found the backup tapes.

Chief information officers could be in hot water, too, if they ignore records management. Keeping records too long or not long enough—even the inability to find an important document—can land the business in court or in the regulatory doghouse, experts say.

Of course, records management is easy to overlook. It is that terribly unpleasant job of setting up and enforcing record-retention schedules, archives of magnetic tape and microfilm, document indexing schemes and policies about whether to keep all that old electronic mail.

But someday, the lawyers and investigators and regulators and press will show up at the door, looking for a paper or electronic document that could strengthen or

torpedo a company's legal position. For example, the Food and Drug Administration recently prodded Dow Corning Corp. to release an 800-page package of internal documents related to the safety of its silicone-gel breast implants.

One company that paid a very

high price for keeping records too long is Manville Corp., which was forced into bankruptcy by lawsuits claiming it knew or should have known the health dangers of the asbestos products it made.

Manville had to produce 16 million related documents, including many memos that legally could have been destroyed but which instead became "powerful ammunition in the hands of plaintiffs," according to Donald S. Skupsky, president of the Information Requirements Clearinghouse in Denver.

Records managers have had the responsibility of making sure that records are kept long enough to satisfy the legal requirements of various regulatory agencies—but not longer. If an organization has a systematic records-management program, it can destroy records in the regular course of business without any legal repercussions.

"Some companies now realize that a good records-management program eliminates a number of sminking gun issues," says Skupsky, author of an upcoming book, *Recordskeeping Reexamined*. "On the other hand, the courts

Continued on page 74



Steve Schaefer

'Inside outsider' takes Fedex IS helm

BY CLINTON WILDER
CW STAFF

Because he works for a company that flies packages all over the world, Federal Express Corp.'s new information systems chief, Dennis H. Jones, chooses an apt metaphor to describe his recent job change. He calls it "parachuting in" to IS from the business side.

As vice president of customer automation and invoicing, Jones ran the Fedex division that is the largest user of IS services—some 700,000 transactions per day. Jones, a 17-year company veteran with a finance background, said that he brings the user's perspective to the IS function.

"I'll never have to say that I've been in the [IS] business 30 years, so I really have to think about changing my mind," Jones said. "I have the opportunity to really challenge or question whatever I choose."

Jones said his top three priorities are customers, customers and customers. In the outthrust overnight delivery

business, Fedex's niche is premier service at premier prices. "We have some one-to-one competitors who attempt to compete on price as opposed to service," Jones explained. "We need to offer a competitive price on a very superior service."

Jones was recently named to replace Ron J. Ponder, senior vice president of information and telecommunications (CW, Feb. 3) but retain his previous position. His new and old departments will be combined, placing him in charge of 4,000 to 5,000 employees.

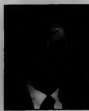
Jones said he will weigh several technology options to make IS "better, faster and cheaper." Although Fedex runs a highly centralized mainframe operation at its Memphis hub, it is considering client/server alternatives. "The issue is, can we design a client/server environment

that takes advantage of the strengths we have been centralized?" he said.

Fedex is a large user of computer-aided software engineering (CASE). CASE-developed applications have shown about a 60% decrease in maintenance requests compared with those applications developed by traditional methodologies, said Thayne Shank, senior manager of systems integration at Fedex's western data center in Colorado Springs.

However, Shank and Jones both said "the jury is still out" on CASE use at Fedex. "Time is the greatest challenge, and the trick is producing high-quality work quickly and consistently," Jones said. The quest for "better, cheaper and faster."

IS at Fedex will not include long-term outsourcing. "We believe that having total control is one of the keys to the quality service we provide," Jones said.



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E N A D V A N T A G E .

Utilities fend off rivals with IS

BY JOHANNA AMBROSIO
OF STAFF

Companies that provide the nation's gas and electricity are going through a time unlike any other in their history, with new competitors legally tapping into their power sources and distribution lines and looking to sell to many of their largest customers. Many observers liken the situation to what occurred in the telecommunications industry a decade ago.

Because of this phenomenon, which many expect will be formalized with procompetitive legislation during the next few years, utilities are worrying more than ever about keeping their customers happy — and keeping them in general. The utilities are increasingly turning to information technology for help.

For example, Connecticut Natural Gas Corp. in Hartford is revamping its customer service

and work management systems to be able to give customers a much narrower time window for service calls.

Within two years, says Connecticut Natural Gas MIS director Russell F. Leavitt Jr., the company hopes to be able to give customers two-hour time frames for when workers will come to their homes, instead of asking customers to stay home all day and wait for the workers to show up.

Surviving change

James T. Pollard, director of information systems at Florida Power Corp. in St. Petersburg, Fla., said, "The nature of the business is changing, and we're going to be in a dogfight for survival. Does anybody remember when AT&T was the only telephone company?"

George Hill, worldwide managing partner of the utilities industry group at Andersen Consulting in Chicago, said, "There

are two overriding factors driving utilities' investments in technology: cost and the competitive situation."

Like many other utilities during the past two years, Florida Power assisted the transition and came up with a six-point strategic plan to stay competitive into the next decade. One of those six areas includes technologies that have been identified as critical for the company. "Our old systems were chugging," Pollard said.

Key to the systems effort is a new customer information system, graphical user interface, open systems and a client/server architecture that will connect any employee in Florida Power with any information he or she needs. "We want to maximize information and support for the people who do the business," Pollard said.

The same general principle applies to National Power PLC in the UK. "We're rolling out the systems now to become a networked organization, flexible and able to respond to customers' needs," said John

Handy, director of information technology. "IT was a key enabler to allow us to make the cultural changes we needed to make. Once you link on a network people that have been used to operating on their own, it changes the very nature of the company."

In many firms, the emphasis on technology has required a massive financial investment during times not exactly noted for their financial robustness. Halfway, for example, said the IT budget has represented about 25% of National Power's revenue for the past three years. Now, however, he said he ex-



pects the annual information technology expenditures to dip back down to 1.5% of revenues.

The task of pitching huge outlays to the top brass in the utilities industry may be somewhat easier than in other businesses, the utilities IS executives said. In many cases, it is evident that the outlaid systems are no longer meeting the businesses' needs, and many utilities have completed their major investments in the physical plant required to generate and distribute the power. So they are not averse to investing in IS.

Even companies that have not yet started major new systems development plans seem to know they will be part of the future.

"There's been a tremendous change from the old thinking to the new," said Donald Scovill, senior vice president of planning at Southern Union Co. in Austin, Texas. "We're now going through and rethinking our entire information technology strategy." He said the plan will be completed in about three months.

Ignore company archive issues at your peril

CONTINUED FROM PAGE 71

have come down very hard on companies that destroy records ahead of the regular schedule, such as when they get wind of an investigation. In 1984 a federal court clubbed Fifer Aircraft Corp. with a \$10 million judgment for selectively destroying documents related to the safety of its aircraft.

Ideally, records managers would be involved in information systems development projects from the outset, so they can offer advice on legal requirements, indexing, archiving and matching the application to the right storage media, says Mark Longene, professor of information management at the University of North Dakota in Grand Forks.

That rarely happens in practice, however. "Most data processing people are just not interested in that or don't know anything about it," says William Safely, a professor in the School of Information Science and Policy at the State University of New York at Albany. "Data processing is concerned about getting a system up and running — not the long-term fate of the information generated by the system," he says.

The distance between the two camps is more than philosophical. In many instances, the records function is located in the administrative services department (along with the mail room, security and cafeteria) because it was traditionally handled

by file clerks.

At the U.S. Department of Commerce, records management has been an "orphan child," says Reed Phillips Jr., director of information resources management. "It's been handed about to several different offices since it left here."

Records management used to be part of his organization, Phillips explains, but it was moved to another office whose managers needed to accumulate more

functions to get a promotion. Experts in this field almost universally call for more collaboration between the records management and computer management camps, to combine the former's strength in document issues with the latter's strength in technology and big-ticket purchases.

At Armo, Inc., a steel maker based in Middletown, Ohio, a "records triumvirate" has developed a relatively close working relationship, says Bill Monteith, director of information resources management.

Monteith explains that his department handles the technology, the legal department determines the legal requirements and the records management

staff enforces the retention schedule. "For instance, we make steel that goes into buildings. We have [a legal requirement] to keep the manufacturing records for as long as that specific building is standing," he says.

Expanding expertise

Records management is now under the wing of the administrative services department, Monteith says, but that will eventually change as Armo slowly moves into the world of digital imaging and the two camps merge.

"Our long-term direction is that records management will be a part of our information management group," he adds. "But I don't see that happening for another five years."

Experts say that it makes sense to put all forms of information management under the CIO's umbrella. Meanwhile, records managers should move beyond their role as document custodians to become experts in the information flows of the organization so they can play a key role in the re-engineering of business processes, says Robert F. Williams, president of Cohasset Associates, Inc., a records management consultancy based in Chicago.

The future is already here at Babson College in Wellesley, Mass., where CIO Richard M. Kesner manages all of the college's information assets, including records management and libraries. Kesner, a certified archivist, says he is a firm believer in the arrangement as long as the CIO understands it is a big responsibility and requires a broad set of skills to be the custodian of all that information.

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IRS: Good-bye paper

In the past, companies have embraced the paperless world of electronic data interchange (EDI) only to find that their legal department wanted paper records to satisfy the Internal Revenue Service.

The good news is that, effective Dec. 31, 1991, companies using EDI need not keep paper records of the transactions, as long as the electronic records have a level of detail equivalent to the old-fashioned ones, the IRS said.

With the new rule, called Revenue Procedure 91-50, "it is clearer that companies can choose electronic media as their [official] records," says Thomas P. Colberg, partner in charge of EDI and change integration at Price Waterhouse in Washington, D.C.

There is a catch, of course. The IRS document requires companies to keep the computerized records for as long as their contents may be relevant to tax laws, ensure that records created on other systems can be retrieved by replacement systems and maintain complete documentation of the system (including software changes and security controls). Then, when the IRS examiners show up, the company must provide all computer resources necessary for them to look at the electronic books.

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COMPUTER CAREERS

Working harder to get the same raise

Cash-poor firms link pay to performance, use funds from attrition to reward deserving employees

BY LESLIE GOFF
SPECIAL TO CFW

The next time you feel like complaining about your boss, think twice — he may have given up his bonus this year so you'd be able to get your raise. Such sacrifices are occurring because while compensation for information systems professionals continues to rise, it isn't increasing at the same rate as it has in the past.

"The recession has a way of slowing everything down," says Steven Fogle, a partner at the Alexander Group, a management search firm in San Francisco.

Figures from the U.S. Bureau of Labor Statistics confirm that IS salaries are increasing (see story at right), but IS chiefs note that companies are not hiring or replacing people at the same rate as in the past. When they do, they're under more pressure to justify it.

To ensure that top IS performers continue to receive decent compensation in tough times, therefore, companies are creating a variety of programs designed to reduce their compensation costs. That means IS workers will see fewer entry-level positions, cuts due to attrition and corporate-wide wage freezes.

Seminole Electric Coopera-

tive, Inc. in Tampa, Fla., cut back on its number of entry-level jobs and used attrition to keep raises up at around 3.5% last year, says William Cross, director of IS, who oversees a staff of 31.

"We have fewer openings today than we did two to three years ago," Cross says. "If someone leaves the company, we use that as natural attrition. If we choose to replace somebody, we have to justify the position."

Furthermore, senior executives at Seminole Electric had to forego their bonuses, a sacrifice becoming increasingly common.

The IS director at a Los Ange-

les-based publishing company, who asked not to be identified, says department heads accepted a wage freeze last year so staff members could continue to receive raises, though those were down to between 3% and 5% instead of the usual 5% to 6%.

"The wage freeze was discussed before it was implemented, and we all agreed that it seemed like the right approach," the IS director says. "It showed employees that although they were not getting as large a raise as they may have expected, we're willing to sacrifice so they can

have it. We're all in this together. It's a team environment."

At Cincinnati Milacron, Inc., a discrete manufacturer of machine tools and plastic processing machinery, a company-wide wage freeze and a furlough program went into effect last year. Even so, there was no change in the IS turnover rate last year.

Mary Jo Burnes, director of corporate IS at the Cincinnati-based company, says normal average raises of 3% to 4% are back in place this year, but the company — like Seminole Electric — is using natural attrition to reduce compensation costs. Prior to the wage freeze, the company, which has been lured by the decline in the defense budget, had gone through pay cuts, layoffs and previous furlough programs.

Consequently, Burnes says, "I'm finding some discrepancies between the salaries corporate IS people have enjoyed in the past and what people in the user departments feel is appropriate."

However, while companies are seeing to it that IS staffs continue to make decent wages, they're not giving the money away. With less money to go around and an economy that discourages job hopping, compensation will be

more closely tied to performance than ever before.

In fact, Roger O'Connor, a consultant at Edward Perini Associates, a New York-based compensation firm, estimates that turnover rates in IS departments last year hovered in the single figures — at approximately 9%.

As a result, many IS directors agree that it has become less imperative to offer non-performance-related financial incentives as a way of retaining employees.

"Overall company performance will be a bigger component of the award determination" in the management incentive program at Tribune Broadcasting Co. in Chicago, says Bill Murray, the company's director of IS. Regular yearly raises were lower than average last year, and rewards for performance will now be more carefully administered.

"We try hard to recognize performance," Murray adds. "Part of that must be in the form of bonuses in addition to a pat on the back and recognition among peers. But we're definitely trying to be more prudent about increases."

"One thing that will translate into a gap between marginal performers and excellent performers. The gap will become more obvious by the way we administer increases."

Goff is a New York-based free-lance writer.

Dollar difference

Average weekly earnings for IS professionals rose to \$792 in 1991 from \$744 in 1990 for systems analysts, software specialists, systems planners, project leaders and other positions categorized as "computer systems analysts and scientists," according to Diane Herz, an economist at the U.S. Bureau of Labor Statistics in Washington, D.C.

On the operations side, weekly earnings were \$755 last year, compared with \$696 in 1990. While the average yearly increase for both operations and systems analysts salaries has been 37.4%, Herz notes that increases in operations salaries are not keeping up with those for analysts. From 1983 to 1991, weekly earnings in operations increased 28.4%, compared with a 51.1% increase for analysts.

LESLIE GOFF

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Opportunities for systems professionals in user training classes on rise

BY EMILY LEINPUSS
SPECIAL TO PC

Thomas Ryan is on a mission. He is deeply into evaluating object-oriented databases, object-oriented programming environments and graphical user interfaces, all with the intent of eventually developing an enterprise-wide information support system that will help train and make employees at his firm more effective.

Ryan, a software engineer in education and professional services at Amdahl Corp. in Sunnyvale, Calif., is one of a growing number of information systems people who are becoming specialists in end-user education.

In doing so, Ryan is stepping down a new and important career path for systems analysts and developers, where "the real push will be in improving the productivity of the worker," he says. Ryan is using his skills to address the growing awareness within corporations of a serious lack of effective training and education.

Reaching out

"Systems people have a unique opportunity to communicate how to use technology to people who are not technical," says Rosemary Gaffney, senior consultant, information services at Colgate-Palmolive Co. in New York. Gaff-

ney has a mainframe software development background but is moving toward instructional design and development at Colgate.

She points to systems analysis skills — the ability to break a subject into pieces or steps; to understand the relationships between the steps to achieve a goal; and the understanding of how a computer works — as crucial for developing educational software and systems.

Ryan's efforts involve com-

munication of need, says Gloria Gery, an independent consultant who works with companies in workplace education and performance support.

"The goal of an EPSS is to enable people with limited or no experience (using computer systems or databases) to perform as if they knew what they were doing," she says.

Ryan's prototype EPSS will incorporate all the information necessary to maintain and fix the myriad of systems that his firm's 2,000 field engineers are responsible for repairing. He is designing it to give the engineer immediate access to the information needed to fix a machine.

Rich Schmetter, manager of field education, design and development at Amdahl, says he sees a real need for these systems and for people with the skills to design them.

Computer-based training offers great promise and opportunity for IS professionals, even when it is not at an enterprise-wide level. In fact, a number of innovative IS departments, as well as pockets of IS professionals, are answering the training call.

Usually these programs are still near the forefront of technology strategy. They are typically

based on open systems with a client/server methodology and use object-oriented technology, expert systems, interactive systems, hypertext languages and multimedia, says Chick Buberg, president of Two-Party Systems, Inc., an IS recruitment firm in Livingston, N.J.

For instance, take Ken Dodd, technical director of computer science at The Travelers Corp. in Hartford, Conn. Dodd is developing multimedia training programs there. One of her department's goals is to create just-in-time help function assistance for the company's workstation users.

Dodd says there is an integrated career path for her at The Travelers. As an IS professional supporting the systems division, she helped develop the workstation; therefore, she had the opportunity to learn about multimedia, and she has part of the responsibility for training development.

Getting involved

Was the nature of the advanced systems — in this case, OS/2 development — that compelled IS people to get involved in training development at Policy Management Systems Corp., according to Michael Mases, manager of professional training and development at the Columbia, S.C.-based insurance firm.

During the past two years, Policy Management Systems has begun to develop a new generation of products. The firm boasts

one of the largest OS/2 shops in the world, and its IS people were anxious to be involved with not only the development of the new systems but the training for them as well.

"IS people have been moving more into the instructional design, course building and educational types of activities on the project," Mases says.

Even companies that are not yet tying in with advanced technologies see the value in having sys-

tems professionals working on computer-based training.

At Humana, a health-care organization in Louisville, Ky., Barbara Merrifield, now senior manager of computer-based education, came from the systems end of the business. She has been designing computer-based training software for three years to teach people in hospitals how to use Humana's financial systems.

"Developing computer-based software is no different from programming. To develop any program you have to go through certain steps. You have to program the screens, think about your target audience and design the system accordingly," Merrifield says.

Merrifield says she sees multimedia and interactive technologies as the wave of the future for training, although she says they have been slow in coming to Humana.

Leifson is a free-lance writer based in Sarasota, Fla.



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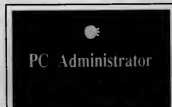
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MARKETPLACE

Smart ways to add memory

BY ALAN RADDING
SPECIAL TO EW

Never has there been more demand for more memory on personal computers, and never has it been so easy and so inexpensive to add it.

New environments, such as Microsoft Corp.'s Windows 3.0 and OS/2, have pushed traditional memory needs (640K to 1M bytes of memory) to a minimum of 2M bytes, with 6M to 8M bytes recommended.

Such demands for memory have renewed the popularity of memory expansion boards, which are not only dropping in price but are becoming easier to install.

Shop around

Probably because this technology has been around for some time, one add-in-memory board is much like another. Just the same, buyers need to shop carefully to get the best price, warranty and ease of installation. They should also shop for compatibility between the speed and size of the memory board — 8, 16 or 32 bits — and that of their system.

The current crop of memory boards cost anywhere from less than \$200 to more than \$2,000, depending on the brand and the amount of memory, which tops out at 32K bytes on the newer boards. These prices reflect hefty price drops that are a direct re-

sult of advances made in the chip technology.

The going price for 1M byte of memory is between \$60 and \$70, down from \$100 a year ago, reports Dan Nease Jr., a senior industry analyst at Computer Intelligence in La Jolla, Calif. Of course, by the time the memory is assembled into single in-line

memory modules (SIMM) and inserted into a board, the retail cost doubles. The price of a memory board reflects not only the size of the board — 8 (IBM PC XT size), 16 or 32 bits — and the actual amount of memory on it, but it also depends on the maximum amount of memory it can accommodate.

Price can be deceiving, however. Many manufacturers sell low-cost units called "OK boards" that contain no actual memory. Prices for these bare boards are deceptively low. Intel Corp.'s AboveBoard 2 Plus lists for \$299 with no installed memory. However, with 2M bytes of memory, the board costs \$599.

A user can buy a "OK-byte" board and plug in separately purchased SIMMs, which are strips of memory chips already mounted in a holder that can be plugged directly into the board. Each SIMM typically adds 1M byte of memory to the board, although

newer SIMMs using higher density memory chips pack 4M bytes of memory on a strip.

Buying SIMMs separately and adding them to OK-byte boards can save a user some money. However, most users don't like to do their purchasing this way.

"OK-byte boards are much more of a headache," says Steven Reed, principal at Reed & Associates, a high-technology consulting firm in Oxnard, N.Y., and a former micro manager at Coopers & Lybrand. Purchasing the SIMMs and the board together is easier because if one of the SIMMs has a bad chip, the user can send the whole thing back, rather than having to replace the chip, he explains.

At the high end of the price range are 32M-byte boards, although most PCs — 16-bit IBM PC AT compatibles — can only support 16M bytes of memory, says Earl Rich, associate editor at technology research firm Faulhaber Information Services, Inc. in Pennsauken, N.J. PCs using 32-bit architectures, such as IBM's Micro Channel Architecture (MCA), can take advantage of the full 32M bytes of memory offered. The PC also plays a role in de-

termining the user's ease of installation. Installing a board into an AT-compatible PC requires physically plugging the board into the slot and running the installation software provided by the manufacturer. The program prompts the user for information on how the memory on the board will be used.

Installing a memory board in a system with MCA requires a little more work because, with the MCA machines, the user needs to run the utility program provided by the manufacturer, as well as run a separate setup disk.

Some boards are even easier to install. Tecmar, a board maker based in Solon, Ohio, describes its MicroRAM and ClassicRAM boards as self-installing, with the configuration process completely transparent to the user.

How fast are your chips?

No matter how easy it is to install, the board won't work unless it's compatible with a user's system. That means checking into the actual speed of the SIMMs on the board. Not only does the user need to ensure that the speed of the SIMM chips is compatible with the speed of his system, but he also needs to add extra SIMM to the memory board, the speed of the new memory chips in the SIMM needs to be as fast as or faster than the existing chips in the board. Chip speeds can run as fast as 60 to 70 nsec, with faster chips costing more.

Another way to ensure compatibility with existing memory and the CPU is to purchase the

board from the PC vendor itself. Users tend to steer clear of their offerings, however, because the boards are significantly more expensive than those sold by third-party suppliers.

Quality concerns

When deciding to buy from a third party, concerns about the quality of memory boards may arise. Michael Hoffenberg, vice president at PC Quote, Inc., a Chicago-based financial services company, was leery of third-party boards because of concerns over quality. However, he opted for Intel's AboveBoard over the MCA memory board "because the price was right."

His concerns about quality proved unwarranted. "Poor quality boards give you memory errors, but we haven't had any problem with the AboveBoard," he says.

Warranties offered by board makers may quell fears about the quality, compatibility and ease of installation of third-party products. Board makers' warranties typically run from one to five years and are pivotal for many buyers when making purchases.

Finally, from the memory management standpoint, users should check for extended memory specification compliance. Although this has become something of a check-off item, it is still quite important because it is the PC industry standard that allows a DOS computer to use more than 640K bytes of memory.

Radding is a free-lance writer based in Newton, Mass.

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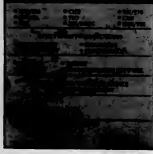
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COMPUTER INDUSTRY

IN BRIEF

CEOs cheer business rise

■ Chief executive officers at technology firms surveyed by the Massachusetts High Technology Council, Inc., gave the Bay State their highest thumbs-up in business climate improvement since 1987, according to an annual survey. The report showed 51% of the surveyed executives registering improvement, in sharp contrast with 8% last year and 2% in '90.

■ ICL PLC and its majority owner, Japanese giant Fujitsu Ltd., are further consolidating their operations in three key regional markets. In North America, Fujitsu-ICL Systems, Inc. — 80% owned by ICL and 20% by Fujitsu — will combine a series of ICL retail systems with Fujitsu's customer services organization. Down under in Oceania, Fujitsu Australia Ltd., owned in inverse proportion, will unite its owners' existing regional operations. Meanwhile, Fujitsu Systems Business — Europe, a wholly owned ICL subsidiary, will sell and support Fujitsu's M-series computers and VP supercomputers.

■ Milwaukee-based Fiserv, Inc., purveyor of information systems management products and services to financial institutions, is poised to acquire First American Information Services, the IS division of St. Paul, Minn.-based Bremer Financial Corp. and its 19-bank client base. Fiserv plans to form a data center in South St. Paul.

Wider U.S. piracy probe urged

BY GARY H. LANTHIER
CW STAFF

WASHINGTON, D.C. — A coalition of trade groups representing U.S. producers of software and other copyrightable items last week petitioned the U.S. government to list Taiwan, Poland and the Philippines among countries where flagrant piracy continues unabated.

The International Intellectual Property Alliance (IIPA) asked U.S. Trade Representative Carlos A. Hills to add the countries to the list of "Priority Foreign Countries." This would allow the U.S. to subject those nations to intense pressure in order to end widespread piracy of software, films, books and sound recordings, the IIPA said.

"The current inadequate copyright regimes in these three countries cause particularly egregious and unacceptable



Yo ho ho

Pirates are casting software vendors plenty

Estimated U.S. trade losses (in millions)

Priority foreign countries	Priority watch list (continued)
Taiwan	\$290
Poland	\$100
India	\$63
Philippines	\$25
Thailand	\$25
Priority watch list	
Germany	\$721
Italy	\$287
Korea	\$123
Egypt	\$14
	Total
	\$1,991

Source: International Intellectual Property Alliance

losses to the U.S.," the IIPA said.

The group, which consists of eight trade associations, includ-

ing the Information Technology Association of America, the Business Software Alliance (BSA) and the Computer and

Business Equipment Manufacturers Association, also designated 18 other countries as copyright violators that should be investigated and negotiated with. The IIPA estimated that the countries named cost U.S. software firms nearly \$2 billion annually in lost trade (see chart).

The BSA singled out Germany in especially sharp criticism, saying the rampant software piracy in that country cost software publishers \$1.9 billion in 1990 — \$721 million of that borne by U.S. companies.

"There is absolutely no enforcement [in Germany] against individuals and companies that make and use copied software," BSA managing director Robert Holleman said.

Hills has until April 30 to identify countries as "Priority Foreign Countries" under Section 301 of the Trade Act of 1974. If after a six-month period of negotiations the offending practices have not ended, the U.S. may take retaliatory trade action against those countries.

EDS revenue passes \$7B, 1992 off to quick start

BY NELL MARGOLIS
CW STAFF

DALLAS — Analysts who recently noted that Electronic Data Systems Corp.'s biggest near-term challenge is topping its own latest record got another peg on which to hang their theory last week as the General Motors Corp. division and outsourcing client streaked by the \$7

billion mark in 1991 revenue.

Annual profit climbed 13% to \$463 million, adjusted for a change in accounting procedures, net income rose 10% to \$548 million.

And the best may be yet to come, noted Kidder, Peabody & Co. analyst Terrance Quinn. Given EDS' contract log for the first 45 days of the current year — a tally that includes the firm's 10-

year, \$800 million outsourcing deal with Blue Cross/Blue Shield of Massachusetts, its second-largest commercial outsourcing score to date — "The company may be looking at its best, new-business year," Quinn said.

Significantly, several EDS executives said, 1991 also marked the first year since GM acquired the company in 1984 that EDS acquired more than half of its annual revenue beyond its parent's purse. Non-GM business accounted for 53% of total revenue for the year.

Contribution to the bottom line came from a particularly diverse mix of activities, including

the following:

■ A 10-year, \$2.1 billion outsourcing contract with Continental Airline Holdings, Inc.

■ A 10-year outsourcing deal with National Car Rental Systems, Inc.

■ Medicaid contracts with the states of Georgia and Indiana.

■ A five-year contract to outsource General Electric Co.'s desktop operations.

■ Expansion in Europe through the acquisition of British systems integrator SD/Scion.

■ Expansion in the manufacturing services sector through acquisition of McDonnell Douglas Systems Integration Co.

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— Mark Roy, consultant, network operations, John Hancock Financial Services



The first 'portable'?

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► Do you have anecdotes about your users, your boss or your job? Know any industry trivia? If so, please contact Lory Zoltola or Jodie Naze at (800) 343-6474. If we use your ideas, we'll send you a gift.

Sources: Special thanks to New Haven UK: the Computer Museum, Boston, CMI Research, Inc.

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IS-plonage

Retired IBM employee Stephen Bennett, 78, helped develop a top-secret IBM computer 50 years ago that decoded intercepted radio messages for the U.S. during World War II. The machines were essentially hot-wired commercial IBM punch-card machines with special relay substitutes. Some of the work done with the computer:

- It decoded messages sent by Germany upon about 10-hour schedules. The Allies used this information to alter shipping routes at the last minute.
- It helped find out that Japanese leaders approached Russian leader Josef Stalin with a peace plan, which Stalin rebuffed.
- It also helped the U.S. learn of a Japanese plan to send false radio messages from the Aleutian Islands after they had been abandoned in an effort to fool the invasion by U.S. forces.

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INSIDE LINES

Inside outsourcing

► The scuttlebutt at Chase Manhattan Bank suggests imminent disclosure of new insourcing and outsourcing wrinkles in the bank's overall IS plan. CIO Craig Goldmann said the bank "continues to review outsourcing and insourcing opportunities throughout Chase on a case-by-case basis." However, said a source close to the bank, "few things would surprise me less" than another outsourcing pact between Chase and IBM subsidiary ESSC, already in a multiyear outsourcing contract with the bank's Chase Manhattan Bank of Connecticut subsidiary.

Gone but not forgotten

► After Peter Lange, DG's head of corporate communications, quit last week, the company laid off an undisclosed number of people in several departments. The unannounced layoff was not "invasive" and is part of "continuing efforts to fine-tune costs," a spokesman said. Lange's resignation was voluntary and unrelated to the layoff, he added. No successor has been named.

On the road to Cairo

► It now appears that Microsoft Windows 3.0, Windows 3.1 and Windows NT were all just stepping-stones on the road to Microsoft's portable Windows

version, code-named "Cairo." Last week, Bill Gates said Cairo is a real product in development—and will be out in "two to three years." But he scribbled at the code name of another Microsoft product in development, a front-end database product reportedly called "Circus." That product, he said, won't be out by June, as some reports had claimed, but will probably surface by year's end.

Temporarily disconnected

► AT&T and IBM are going to be six months late delivering the promised link between their respective network management systems, an AT&T spokesman confirmed. The link, originally slated to ship by the first half of this year, is now scheduled for shipment by the second half, with beta testing to begin in the second quarter, he added. The link promises to let users correlate alerts across SNA systems managed by IBM's NetView and multivendor telecommunications devices managed by AT&T's Accumaster Integrator. However, this is already possible using the existing link between Accumaster and System Center's Net/Master.

Look Mom, no hands!

► Apple Chairman John Sculley took a few minutes at a technology conference last week to give an advance look at an upcoming Macintosh that responds to spoken commands. The system runs on an Intel 68040 chip and has a vocabulary of several hundred words, according to Apple's vice president, Roger

Heinen. Although voice-recognition machines are not new—companies such as Dragon Systems in Newton, Mass., have shown similar systems working on PCs—Apple's commitment could be an important boost for the speech-recognition business. Don't expect Apple's system anytime soon, however—it could take years to hit the market.

Go west

► It seems that with the closure of IBM's desktop software unit, the company isn't dead set against staying true blue, so to speak. Rumor has it that the company is contemplating a switch to a new word processor companywide. You can bet it won't be from any Redmond, Wash.-based firm, either. Orem, Utah, sounds much more realistic.

If IBM really executing its ambitious plan to convert the company into a federation of zippy entrepreneurs? It's happening, says one highly placed source close to the company—and he has lots of supporting evidence. Paraphrasing John D. Rockefeller, the source says that IBM has been thinning considerably, the source said. "You don't come to the mountain anymore," he noted. "Much more of the important action is taking place out in the regions." *Nirvan Editor Allen Alper is constantly scouring the regions for news tips. Phone, fax or CompuShare him at (800) 343-6474; (508) 875-8931 or 76537,3413.*

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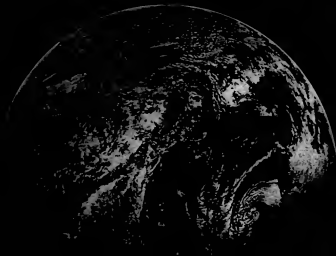
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